TRANSCRIPT OF PROCEEDINGS BEFORE THE
STATE OFFICE OF ADMINISTRATIVE HEARINGS
(TEXAS COMMISSION ON ENVIRONMENTAL QUALITY)
AUSTIN, TEXAS

APPLICATION OF TEXCOM GULF DISPOSAL, LLC, FOR TEXAS COMMISSION ON ENVIRONMENTAL QUALITY COMMISSION UNDERGROUND INJECTION CONTROL PERMIT NOS. WDW410, WDW411, WDW412 AND WDW413	SOAH DOCKET NO. 582-07-2673 TCEQ DOCKET NO. 2007-0204-WDW
APPLICATION OF TEXCOM GULF DISPOSAL, LLC, FOR TEXAS COMMISSION ON ENVIRONMENTAL QUALITY COMMISSION INDUSTRIAL SOLID WASTE PERMIT NO. 87758	SOAH DOCKET NO. 582-07-2674 TCEQ DOCKET NO. 2007-0362-IHW

HEARING ON THE MERITS
THURSDAY, DECEMBER 13, 2007

BE IT REMEMBERED THAT at 9:00 a.m., on Thursday, the 13th day of December 2007, the above-entitled matter came on for hearing at the Montgomery County Commissioners' Court, 301 N. Thompson, Suite 200, Conroe, Texas before THOMAS WALSTON AND CATHERINE EGAN, Administrative Law Judges, and the following proceedings were reported by Patricia Gonzalez and Evelyn Coder, Certified Shorthand Reporters of:

Volume 2 Pages 334 - 633

PROCEEDINGS
THURSDAY, DECEMBER 13, 2007
(9:00 a.m.)

JUDGE WALSTON: We'll go back on the record at this time. This is day two of the hearing on the Application of TexCom Gulf Disposal for Underground Injection Control Permits and an Industrial Solid Waste Permit. I'll note for the record that the proceeding today is being held in the Commissioners' Courtroom in Conroe in Montgomery County.

And can the applicant -- and I believe the County were going to post notices at the Civic Center where this was originally scheduled to be heard today advising people that the hearing was going to be held in this facility. Did that get accomplished? Can we just confirm that on the record?

MR. RILEY: We called after we were off the record yesterday, and the County took responsibility for doing that.

MR. WALKER: One of my assistants went out yesterday evening and posted the notice, Your Honor.

JUDGE WALSTON: Okay. Thank you very much. We will resume.

Mr. Greg Casey is on the witness stand, and I believe we were in the process of redirect examination by the applicant.

And, Mr. Casey, I remind you that you remain under oath.

A Yes, sir.

MR. RILEY: Thank you. May I step to the board again?

JUDGE WALSTON: Yes, sir.

MR. RILEY: Thank you.

PRESENTATION ON BEHALF OF THE APPLICANT (CONTINUED)

GREG CASEY, P.E.,

having been previously duly sworn, testified as follows:

REDIRECT EXAMINATION (CONTINUED)

BY MR. RILEY:

Q Mr. Casey, I'm going to take up the topic that we were discussing yesterday afternoon, specifically a well that we've come to know as C-4 and that correlates to a Railroad Commission identifier 66-D. Do you remember that discussion?

A Yes, sir.

Q And in our discussion yesterday to the present time, we had been able -- unable -- or you had been unable to locate records of a 66-D that is, I

guess, located on the T.C. Howell tract or survey and that there was another packet of documents referring to a 66-D that was on a Lemuel Smith survey. Is that correct?

A That's correct.

Q And last evening, did you have an opportunity to review the Lemuel Smith survey?

A Yes, sir, I did.

Q And could you tell the Judges what your -- what your review entailed and what you found?

A Well, we went back and looked at -- we've gone to the Commission three times to try and find data on Well C-4. The data in the application points to Well 66-D that's located in Lemuel Smith survey. And when we went back, as part of getting prepared for the hearing, we asked for information on wells around Well 315 and came back with the same information for Well C-4, the well located in the Lemuel Smith survey.

We had an associate go over there yesterday again to ask for data for this particular well site, and the data that came back was the same as we already had for the well located on the Lemuel Smith survey. When we asked what -- you know, "Why do we keep getting this data for a well that's located in a different survey," the response we had is that, you

know, "This is the data associated with that well spot and that more than likely the well has been mislocated on the Railroad Commission map."

We went and I reviewed the Lemuel Smith survey using the information off of the well records to see if there was a Well 66-D located in the Lemuel Smith survey. And reviewing the survey map and, you know, well distances in the data for Well 66-D, there is not a well located in that survey with that nomenclature, which, to me, says that, you know, at whatever time back in history somebody put the spot on the map in the wrong place and it was not located in the correct survey when they plotted the map.

Q If -- so there seems to me there's two possibilities, either the driller or the holder/owner of the well misidentified the tract in which the well is located and it is plotted correctly on the Railroad Commission map on the T.C. Howell survey -- that's one possibility. Correct?

A Yes. That's correct.

Q The other possibility is it's not on the T.C. Howell survey in the area of the proposed facility at all and it's located five miles or so in which direction?

A It would be south, southwest.

Q In the Lemuel Smith survey?
A Yes, sir.
Q All right. So either two possibilities -- since you have no personal knowledge of where the well is located, either of those two possibilities are, indeed, possible.
A Those are two possibilities. My belief is that it's actually located, based on the distances -- let's go ahead and go to the record.
It's in Volume 4, Page -- well, let's see. It starts on Page -- starts on Page 20 of TexCom Exhibit 8.
If you look on Page 25, that's a plug-in report for the Well 66-D. It would be -- it says Box 8. It gives the location for the lease boundaries -- actually, instead of the lease boundaries, it's noted in there, it's actually to the survey boundaries, and it shows a well location 2,700 feet from the northwest line of the survey and 18,390 feet from the northeast line of the survey.
The survey where the well is plotted is not 18,000 feet across. It's a smaller survey. So it would be -- based on those dimensions, it would be impossible for the well to be located within that survey.

Q Is it your opinion then, Mr. Casey, that, in fact, C-4 or Well 66-D is actually located in the Lemuel Smith survey?
A Yes, sir, it is.
Q Okay. I'm going to indicate that on what's been received into the record as a demonstrative exhibit, TexCom 62, with a red circle around Lemuel Smith. And that's your opinion as to where that well is located?
A Yes, sir, it is.
Q Now, let's assume that you're incorrect for just a second and it is as plotted on the T.C. Howell survey. Is there a depth associated with that well?
A Yes, sir, there is.
Q And what is that depth?
A A total depth of 5,020 feet.
Q I'm going to write that up here somewhere.
(Brief Pause)
Q (By Mr. Riley) If the well were located on the T.C. Howell survey as plotted in the Railroad Commission map, what depth would 5,020 feet be associated with in terms of a stratum below the proposed site?
A That's within the Jackson shale.
Q Okay. So that's actually in the shale layer.

Is that correct?
A That's in the shale layer above the upper Cockfield.
Q Let's -- so even if -- again, even if the well is located as plotted on the application map and the Railroad Commission map in the C-4 location, this would still be at least above the upper Cockfield and into a shale layer and consistent with the other wells we've discussed.
A Yes, sir, it would.
Q And I think we covered this yesterday. We now have Railroad Commission records that, in your opinion, are associated with all the wells that are in the cone of influence.
A Yes, sir.
Q And it's as depicted on this exhibit, 428 is Railroad Commission 29, C-12 is Railroad Commission 27, C-7 is Railroad Commission 28.
A That's correct.
Q Returning to the other diagram I was working with yesterday, we've been talking about various layers beneath the site, and as we talked about it yesterday, it's a crude depiction of what geologic stratum look like -- strata, I suppose.
When we were talking yesterday -- and

forgive me for forgetting where we left off, but we were talking about the different permeabilities that are expected in the various parts of the Cockfield formation.
A Yes, sir.
Q And you had in the injection interval, again, with all the discussion that was held yesterday, about 500 to 800 millidarcy permeability.
A Right.
Q All right. And then 1 millidarcy for the middle Cockfield and 1 to 1.5 for the upper Cockfield.
A 1 darcy for the --
Q I'm sorry.
A -- middle and 1 to 1-1/2 darcies for the upper.
Q Right. And, actually, while it may seem planned, I misspoke. I'd like you to explain the difference between millidarcy and a darcy.
A Millidarcy is one thousandth of a darcy, so --
Q If there were a connection in the area around the well between the middle Cockfield and the upper Cockfield, either through an artificial penetration, which we don't have any evidence of, or some sort of fracture or some -- some mechanism, communication

through this narrow shale layer that separates the two stratum, would your pressure gradient fall off more quickly, more slowly? How does it work, if, indeed, there is any transmissivity between those lawyers?
A If there's connection between the lower and the middle?
Q Yes, sir.
A Your pressure would drop off faster because you have higher permeable zone available to accept the pressure. So the fluid would move more easily into the higher permeable strata, and so your pressure build-up would be significantly less.
Q So is it fair to say, then, your expectation would be that the cone of influence is actually much narrow -- or closer to the radius is smaller than 750 feet?
A Yes.
Q Now, based on your evaluation of the information available to you and the information presented in the application, do you think that there is a communication between the -- say, the lower and the middle Cockfield?
A I believe there's communication at the fault located 4,400 feet south of the injection site.
Q Is that depicted in the application?

A Yes, it is.
Q How about between, say, the middle and the upper Cockfield?
A There again, at the fault, 4,400 feet from the well site, those layers, the middle and the upper are in communication.
Q And that's -- is that how you modeled them in the BOAST98 model?
A We didn't include the upper because it's -- it wouldn't make any difference in the model itself. It would actually make the -- everything smaller. It would make the cone of influence smaller if we included the upper; so we basically limited it that at the fault it could cross into the middle, and we -- we didn't include the upper because it just adds more thickness and your pressure would drop lower. So to be conservative, we said, you know, we'll just limit it to going to the middle.
Q Is that another aspect of conservatism in your modeling?
A Yes, it is.
Q Good news. I think I'm done with the diagram. I just have a few more questions.
MR. RILEY: Actually, while we're on that topic, I'd ask that this be identified for the

record as TexCom Exhibit 68.
(TexCom Exhibit No. 68 marked)
MR. RILEY: And I'd ask that it be accepted into the record as a demonstrative exhibit.
JUDGE WALSTON: Is there any objection to TexCom Exhibit 68 being admitted for demonstrative purposes only?
(No verbal response)
JUDGE WALSTON: There being no objection, it's admitted.
(TexCom Exhibit No. 68 admitted)
MR. RILEY: I have no further questions at this time. I pass the witness.
JUDGE WALSTON: Okay. Any recross by Lone Star?
MR. HILL: Brief recross, Your Honor.
JUDGE WALSTON: Okay.

RECROSS-EXAMINATION

BY MR. HILL:
Q Good morning, Mr. Casey.
A Good morning.
Q I have some follow-up questions based on the conversation that you and I had yesterday and based on the redirect examination of Mr. Riley.
We talked, yesterday, about -- I believe

you indicated -- acknowledged that there was, indeed, a fall-off test included on WDW-315. Is that correct?
A That's correct.
Q That test was conducted as part of the completion report that was required under TCEQ rule to be conducted with respect to that well. Is that right?
A That's correct.
Q And you've reviewed the results of that fall-off test?
A Yes, sir, we have.
Q Your understanding is that the fall-off test recognized that the permeability of the injection reservoir at the current perforated interval was around 81 millidarcies. Is that right?
A That's correct.
Q Is there any reason why you don't believe that that, indeed, is an accurate depiction of the permeability of the injection reservoir at that perforated interval?
A It's the permeability they determined from testing that portion that they perforated. In reviewing the perforated interval, the areas they chose to perforate contain a high quantity of shale in them. They're not the high-quality sands that were

available in other portions of the lower Cockfield, including the portion that was cored during the drilling of the well. For whatever reason, they chose to perforate in the lower-quality portion of the reservoir.

Q Based on that -- the presence of so many shales in that particular strata, is there a reason why you would doubt that the 81 millidarcy reading of that particular fall-off test is incorrect?

A As far as the analysis shows, it's the value they determined during their fall-off test from their analysis.

Q And you believe that, then, the well as it exists today -- as distinguished between adding additional perforations down the road, that WDW-315 as it exists today has an average permeability in the perforated interval of 81 millidarcies. Is that correct?

A That's correct.

Q Okay. Along those lines, then, if additional perforations were not made to WDW-315 and if operations were conducted on that well -- injection operations as it exists today, the model that ALL Consulting -- that you put together and your team put together with respect to that application, does it

accurately depict the permeability of the injection reservoir as that well was constructed and perforated today?

A No.

MR. HILL: Thank you, Mr. Casey.

I pass the witness.

JUDGE WALSTON: Okay. Montgomery County, Conroe?

MS. STEWART: I have no further questions for this witness.

MR. WALKER: One moment, Your Honor.

(Brief Pause)

MS. STEWART: I withdraw that statement --

(Laughter)

MS. STEWART: -- and I would like to ask one question.

JUDGE WALSTON: Okay. Sure.

RECROSS-EXAMINATION

BY MS. STEWART:

Q Mr. Casey, if other subsurface faults exist in the area of review, would their existence affect your calculations that you've just expanded upon?

A Well, I don't believe any -- other faults exist other than the ones that we mapped.

Q But if they did, if other subsurface faults do exist, would that affect your calculations?

A Not necessarily. It depends on, you know, if there's sufficient throw to -- you know, in the fault or their orientation to the injection well. There's lots of other factors that would come into play, because, you know, you could have a fault out there that has, you know, little or no displacement; so it wouldn't affect your calculation.

Q Would it be important in your calculations to locate any additional faults if they do exist?

A Yes.

MS. STEWART: I have no further questions. Pass the witness.

JUDGE WALSTON: Okay. Individual Protestants.

MR. FORSBERG: Yes, Your Honor, just briefly.

RECROSS-EXAMINATION

BY MR. FORSBERG:

Q Good morning, Mr. Ross.

A Mr. Casey.

Q Mr. Casey. I'm sorry.

(Laughter)

Q (By Mr. Forsberg) I haven't had enough

coffee yet this morning.

Is it my understanding that you located information regarding C-4 or made opinions regarding this Well C-4 last night?

A I talked to our associate who looked at the Railroad Commission record yesterday.

Q Okay. Was there some record or something that didn't exist when the application was made -- when the initial application was made to TCEQ that you couldn't have found at that time?

A No. The records we received are the records we've received every time. It's the same records that are in the application. You know, we pulled the records based on the Railroad Commission map and it was put into the binder as, you know, "Here's the positions." You know, the fact that it was actually in a different survey was never noticed because we didn't specifically study that well because it's outside the cone of influence.

Q But it was one of the -- one of the wells that you identified as potentially being inside the cone of influence, was it not?

A Right. In our subsequent review, we determined that it's potentially within the cone of influence. And in reviewing the -- you know, trying

to get all the data together, make sure we're -- you know, everything is correct, we noticed that it's actually in the wrong survey.

Typically, we go with the well spot -- "Okay. The Railroad Commission says it's there," and we're looking at the well data as far as, you know, completion, formation, that sort of stuff. You know, I did not notice that it was, you know, actually in a -- you know, says to be in a different survey.

Q And that isn't something that you would have checked into when the application was done prior to this hearing; that was something you were able to do after hours the first day of the initial -- of this hearing.

A When we gathered the data, it was -- our understanding, it was located in -- you know, around the wellbore. So that's why we included the information in the -- you know, as being plotted where it's at.

Q But there's no new information that's provided that you looked at for this opinion that you testified about this morning.

A The only new information we received is the fact that we've asked for the data two additional times and come back with the same information that we

already have, and that in discussion with the clerk at the Railroad Commission, is that it has either been mislabeled on the paperwork as the Lemuel Smith survey or that the well was misplotted. And that's the data we received yesterday.

Q From an unidentified clerk at the Railroad Commission?

A That's correct.

Q Okay. In your work, are you familiar with a document called -- or a publication called the Atlas of Major Texas Oil Reservoirs from the Bureau of Economic Geology?

A Yes. I've, you know, used it a time or two. Yes, sir.

Q Okay. Is that a document that is used in your business, line of work?

A From time to time, yes, sir.

Q Is it an authoritative document, something that can be relied upon?

A It's a good source of information.

Q Okay.

A Yes.

Q Did you look at that document at all with regards to your opinions regarding the number of faults and breaks between the Cockfield formations --

between the lower, middle and upper Cockfield?

A Personally, I did not. No, sir.

MR. FORSBERG: That's all. Thank you.

JUDGE WALSTON: Anything from Public Interest Counsel?

MS. COLLINS: Just one question.

RECROSS-EXAMINATION

BY MS. COLLINS:

Q Mr. Casey, is it your understanding that TexCom will be required to perforate the entire 145 feet?

A Yes, ma'am.

MS. COLLINS: Okay. No further questions.

JUDGE WALSTON: From the Executive Director?

MR. WILLIAMS: Just a few questions.

RECROSS-EXAMINATION

BY MR. WILLIAMS:

Q Mr. Casey, do you know at what depth the core sample was taken from Well 315?

A I can look it up.

Q Would you, please?

A Yes, sir.

(Brief Pause)

A I believe Volume 6 of the application, TexCom Exhibit 11.

(Brief Pause)

JUDGE WALSTON: Which volume are you looking at?

A It is Volume 9.

Q (By Mr. Williams) Volume 9.

A It would be Page 126 of TexCom Exhibit 11. Under 4.2.1, "Depths, Types and Recovery," the second paragraph says "The second core was taken from the Cockfield formation at a depth of 6,070 feet." They attempted to core 30 feet and recovered a little over 14 feet of core.

Q Okay. And depth was 6,070 feet, and it puts it in which part of the Cockfield?

A That is the lower Cockfield.

Q Lower Cockfield. But that's above or below, which, of the current perforation?

A It's above the current perforation.

Q By about how far?

A The top of the perforated interval is 6,184 feet, and it goes -- extends down to 6,372 feet.

JUDGE WALSTON: Could you give me those numbers again, the top and the --

A The top is 6,184.

JUDGE WALSTON: Okay.
A And the bottom perf is 6,372.
Q (By Mr. Williams) That's perforated interval?
A That's perforated interval. And there's roughly -- there's 100 feet of actual perf over that distance.
Q Okay. Could you indicate where you found that information?
A Yes, sir. It's Texcom Exhibit 11, Page 38.
Q Page 38. Thank you.
Now, is it your testimony that the additional 45 feet of perforation will not be continuous with the current perforation? Is that correct?
A That's correct.
Q Okay. For informative purposes, how do you perforate a pipe once it's in the ground?
THE REPORTER: I'm sorry. I couldn't hear you.
Q (By Mr. Williams) How do you perforate a pipe?
A Using a wireline or a tubing set tool -- they have perforating -- what they call perforating guns. It's basically a shaped charge that they run in the

well, and when you set it off, it will shoot a -- anywhere from a quarter to a half inch hole in the pipe and extend out 14 to 18 inches in the formation.
Q Okay. Once a section is perforated, can you unperforate it?
A No, sir -- well, I take it back. You can unperforate it by cementing it.
Q Okay. Is the Lemuel Smith survey anywhere within the cone of influence of TexCom -- I'm sorry -- area of review on TexCom Exhibit 56?
A No, sir. It's south.
Q South. It's off the map.
A It's off the map. Yes, sir.
MR. WILLIAMS: I have no further questions. I'll pass the witness.
CLARIFYING EXAMINATION
BY JUDGE WALSTON:
Q Okay. Mr. Casey. I had one clarifying question. If you can, go back to Volume 4, Exhibit 8, Page 25 in the Railroad Commission report.
A You said Volume 4?
Q Yes.
A Exhibit 8?
Q Yes. Page 25. It was the report.
A Yes, sir.

Q I just noticed, on the Block 9b, it says the well location was 5.9 miles southeast from Conroe.
A Yes, sir.
Q Does that help any or not, or is -- does that depend on where you measure from Conroe or --
A Well, from Conroe, it would still be off our map to the south.
Q Okay. So that would also, I guess, from what you're saying, tend to confirm that it was -- the well was actually on the Lemuel Smith survey?
A Yes, sir, it does.
JUDGE WALSTON: Okay. Thank you. That's all I have.
Any follow-up questions?
MR. RILEY: Just a few. And I apologize to everyone and I'll give Counsel an opportunity to review this document, if it's appropriate. It is a certified copy of the Railroad Commission records relevant to 66-D which I was going to show the witness and introduce into evidence. Unfortunately, I don't have copies for everyone at this moment. I'll give everyone an opportunity to look at it, if that's appropriate. And I would make copies and hand them out after lunch, if that works for everybody.
JUDGE WALSTON: So you're offering that

into evidence?
MR. RILEY: I was going to have the witness look at it and see if it's the same record or a more thorough record and confirm that the certification date is December 12th, 2007.
(Pause)
FURTHER REDIRECT EXAMINATION
BY MR. RILEY:
Q Mr. Casey, could you take a look at the document that's just been handed to you by Mr. Williams?
A Yes, sir.
Q And do you find in that document at least a copy of the certification by the Texas Railroad Commission dated 12/12/2007?
A Yes, sir, I do.
MR. RILEY: Let me ask if the Court wouldn't mind marking that as TexCom Exhibit 69.
(TexCom Exhibit No. 69 marked)
MR. RILEY: At this time, Your Honor, I'd offer it into evidence as TexCom Exhibit 69.
JUDGE WALSTON: Any objections?
(No verbal response)
JUDGE WALSTON: There being no objections, TexCom Exhibit 69 is admitted.

(TexCom Exhibit No. 69 admitted)
MR. RILEY: And with your permission and permission of the parties, I'll make copies of the document at lunch and provide it to everyone.
JUDGE WALSTON: That would be helpful.
Q (By Mr. Riley) Mr. Casey, have you had a chance to look through TexCom Exhibit 69?
A Yes, sir.
Q And it's a -- there are more pages in TexCom Exhibit 69 than were originally provided with the application. Is that correct?
A That's correct.
Q And does that indicate that it is the -- as best you know from your experience with the Texas Railroad Commission, a complete copy of the well file?
A Yes, sir, it is.
Q Does it confirm what you had said earlier about the existence of the well, the location of the well in the Lemuel Smith survey?
A Yes, sir, it does.
Q And is the -- also additional information about a reworking of that well?
A (No response)
Q That's all right. I'll withdraw the question. The record will speak to the issue.

But the total depth of 5,020 feet, is that confirmed in TexCom Exhibit 69?
A Yes, it is.
Q Mr. Hill asked you about the fall-off test and Ms. Stewart asked you about other subsurface faults, and is there any relationship that one could decipher or determine from a fall-off test as to location to a fault?
A Yes. And when you run a fall-off test, a lot of times you can identify changes in the reservoir out a distance from your well based on the pressure response, and a fault or a -- what we call a -- if you had a subsurface barrier of some sort -- you know, let's say there was a granite intrusion at some point out, you know, so many thousands of feet from the well. If your fall-off test reached that distance in the pressure response, you would see that as a boundary -- what we call a boundary effect.
Q Would a fault show up in that boundary effect or -- explain that for me.
A It could show up. It could show up. A fault could show up a couple of ways. One, if it was a nontransmissive fault, like a barrier to flow, you'd see a pressure response. Basically, it's kind of like the Doppler effect. The pressure goes out and it

would bounce back and you'd see a pressure inflection in your data. If you entered an area of higher permeability, you would see a pressure response also. The pressure would tend to drop off.
Q Does a fall-off test have a distance associated with it? In other words, does it measure that phenomena a certain distance from the wellbore?
A Yes, depending on the quality of the data, you typically determine how far out in the reservoir the test looked.
Q With the fall-off test that was done with the existing well, what was that distance?
A Let me see if I can pull that.
(Brief Pause)
JUDGE WALSTON: Which volume is that?
A It's in Volume 9. It would be Page 165 of TexCom Exhibit 11. This is a copy of the well test analysis done on the fall-off test that was conducted after WDW-315 was drilled, and in the -- it would be the second to last paragraph, the last sentence, he states "No reservoir boundaries were observed in the radius of the investigation of this test, which was determined to be 1,500 feet."
Q (By Mr. Riley) So while you disagree with the choice of sand to where the well was perforated in

terms of the overall permeability of the sand -- we've talked about that. 81 millidarcies versus 500 millidarcies --
A Yes, sir.
Q -- the distance investigated in the fall-off test would indicate that there is no -- you explain. What does it indicate?
A Well, it indicates there was no boundaries, you know, seen within 1,500 feet of the wellbore. So there's no areas of higher permeability or a fault or no-flow boundary seen within 1,500 feet.
MR. RILEY: Thank you. I have no further questions and I pass the witness, I suppose.
JUDGE WALSTON: Lone Star.
MR. HILL: No questions, Your Honor.
JUDGE WALSTON: Okay.
MR. WALKER: One moment, Your Honor.
FURTHER RECROSS-EXAMINATION
BY MS. STEWART:
Q Mr. Casey, could you please explain briefly what the purpose of a fall-off test is?
A It's one method of determining the reservoir properties. Typically, you're trying to determine your permeability.
Q So the primary purpose of a fall off test,

based on your testimony, is to determine permeability?
A Determine permeability, look for, you know, boundary conditions, those sort of issues.
Q Is it typically used to identify faults?
A Not typically, no, but they can be identified from a fall-off test.
Q So that would not necessarily be the most reliable method of determining faulting within the distance that this fall-off test extends?
A It's a reliable method, yes.
Q And, again, could you remind the Court what the distance that the waste plume will travel within 30 years of a facility's operation?
A I believe it was twenty -- 2,770 feet, I believe.
Q So fall-off test is not a primary means of determining faults, and its distance is 1,500 feet from the wellbore. Correct?
A This fall-off test saw 1,500 feet out from the reservoir.
MS. STEWART: I have no further questions.
JUDGE WALSTON: Okay. Individual Protestants.
MR. FORSBERG: Nothing further, Your

Honor.
JUDGE WALSTON: PIC.
MS. COLLINS: No questions.
JUDGE WALSTON: Staff.
MR. WILLIAMS: No questions.
JUDGE WALSTON: Okay. Thank you, Mr. Casey. You can step down.
Do you need a minute to get ready for your --
MR. RILEY: I was going to say if you want to take a morning break and we can -- before the next witness.
JUDGE WALSTON: Sure.
MR. WILLIAMS: A point of order. Mr. Riley added some marks this morning to Exhibit 67. I know it's just for demonstrative purposes, but does that need to be readmitted?
MR. RILEY: I was going to actually do that at some point, because the next witness also will have, hopefully, something to say about Exhibit 67.
JUDGE WALSTON: Okay. We'll go off the record and we'll take a 15-minute break. We'll come back at 10 minutes after 10:00.
We'll go off the record at this time.
(Recess: 9:56 a.m. to 10:10 a.m.)

(TexCom Exhibit No. 57A marked)
JUDGE WALSTON: We'll go back on the record.
Will you raise your right hand?
(Witness sworn)
JUDGE WALSTON: Be seated and state your full name for the record.
A My name is Bruce Langhus. That last name is spelled L-a-n-g-h-u-s.
JUDGE WALSTON: Thank you, Dr. Langhus.
MR. RILEY: Thank you, Judge.
BRUCE G. LANGHUS, Ph.D., CPG,
having been first duly sworn, testified as follows:
DIRECT EXAMINATION
BY MR. RILEY:
Q Good morning, Dr. Langhus.
A Good morning.
Q Would you briefly describe your role in the preparation of the TexCom underground injection control well application?
A I prepared the geological exhibits and the geological narrative to accompany the application.
Q In relationship to this proceeding, have you also prepared prefiled testimony and provided a copy of your resume which have been previously marked as

Applicant's Exhibits 57 and 58?
A Yes, sir.
Q Have you reviewed that testimony in preparation for your live testimony here today?
A Yes, sir.
Q Do you adopt it today as your sworn testimony as if you were asked those questions and -- I'm sorry. Before I do that, are there any corrections to that testimony --
A Yes, sir.
Q -- that you would like to make at this time?
A Yes, sir. Yes. There's one amplification.
Q And I believe --
MR. RILEY: Or I would ask that this be marked as Applicant's Exhibit 57A. I believe copies have been distributed to all parties.
Q (By Mr. Riley) Is 57A the amplification that you're referring to -- or that you just referred to in your last answer?
A Yes, sir.
Q With the amplification in 57A and the prefiled testimony previously identified as 57 and your resume as Exhibit 58, is that the testimony that you would offer in this matter as your sworn direct testimony?

A Yes, sir.
MR. RILEY: At this time, I'd offer Applicant's exhibit 57, 57A and 58.
JUDGE WALSTON: Okay. There were no objections filed previously; so TexCom Exhibits 57, 57A, and 58 are admitted.
(TexCom Exhibit Nos. 57, 57A and 58 admitted)
MR. RILEY: Thank you, Doctor.
Pass the witness.
JUDGE WALSTON: Okay. Lone Star.
MR. HILL: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. HILL:
Q Good morning, Dr. Langhus.
A Good morning.
Q I'm Jason Hill. I'm with the Lone Star Groundwater Conservation District. I just have a handful of questions for you.
In your prefiled testimony, you reference three UIC -- what you refer to as UIC applications that you participated in that have been filed with a Texas regulatory agency. Is that correct?
A Correct.

Q One of those you identify as a Class II well -- disposal well in Wise County. Is that right?
A That's correct.
MR. RILEY: I apologize, Your Honors. I'm having some trouble hearing Mr. Hill. I think it's the air conditioner.
JUDGE EGAN: It's the air conditioner.
MR. HILL: Let me see if I can do better.
Q (By Mr. Hill) One of those was in Wise County -- is that correct -- Class II wells, Dr. Langhus?
A That's correct.
Q And then there were two applications left, and I -- let me back up. These are three applications in addition to the TexCom application. Is that correct?
A Correct.
Q Do you mind describing the other two applications you participated in?
A Let me think. The two that I participated in was a combined Class II and Class I well in Cleburne County, Texas. The other was a Class I disposal well in Pittsburg County, Texas.
Q Were those two applications ultimately approved by the TCEQ?

A Yes, sir.
Q Were you working on behalf of the applicant on both of those?
A Correct. Correct.
Q Can you disclose the identity of the applicant for each --
A Certainly. In Cleburne, Texas, the applicant was Hallwood Exploration and also the City of Cleburne, and in Pittsburg County, it was -- Pilgrim's Pride was the industrial client there.
Q Thank you, Dr. Langhus.
In reading through your prefiled testimony, part of your analysis with respect to TexCom and the TexCom UIC application included a look or a review for faults in the area of review. Is that correct?
A Correct.
Q You mentioned in your prefiled testimony that you reviewed hearing files from the Railroad Commission on the -- the Exxon hearing files for 1979 and 2002. Is that correct?
A There were a number of Humble, dash, Exxon filings in front of the Railroad Commission that I examined from about 1936 to 1996.

Q Do you happen to have your prefiled testimony in front of you?
A I do.
Q Would you mind turning to Page 8 of your prefiled testimony?
A (Witness complied)
Q There's a question and answer there from, essentially, Lines 12 down to the end of the page. And, specifically, at Lines -- and the question at Line 12 is: "What sources of information did you rely upon in performing your analysis." And I'm looking at Lines 23 down to the end of the page and I see 1979 Exxon file and a 2002 ExxonMobil file. Is that -- am I reading your testimony correctly?
A Correct. These are some of the most important sources -- as it says on Line 16, some of the most important sources that I used.
Q Okay. So there are other sources that you referred to?
A Oh, yes.
Q Okay. Would those other sources include Exxon hearings files as well?
A That's correct.
Q Can you identify those Exxon hearing files?
A Besides the Michaux and Buck article in 1936,

there's a 1972 filing before the Railroad Commission, a 1976, a 1977 and 1979, as well as the 1996.
Q So if I understand you correctly, in addition to the '79 and 2002 files, you reviewed files from the Exxon hearing in 1972. Is that --
A Correct.
Q 1976, 1977. Are those correct?
A '79.
Q 1979 and 1996?
A (Witness nods head)
Q Is that --
A That's --
Q -- correct?
A -- correct. That's correct.
MR. HILL: Thank you, Dr. Langhus.
I pass the witness.
JUDGE WALSTON: Montgomery County.
MR. WALKER: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. WALKER:
Q Good morning, Dr. Langhus. My name is David Walker.
A Good morning.
Q Let me proceed along that same line of questioning that Mr. Hill asked you. You listed in

your prefiled testimony, on Page 8, four sources of information that you say you rely upon. Is that correct?
A Correct.
Q Why did you not list the other sources that you've just enumerated to Mr. Hill?
A These were the -- those that -- that were in front of me at the very moment that I filled this out, and they were among the most important sources of data on faulting that I've relied upon.
As a matter of fact, the 1936 article by the Exxon geologist is one of the most important -- one of the best studies that I've seen for determining faulting in the area. The 1979 one was also. The 1996 filing by Exxon was also.
Q Would you agree with me, Dr. Langhus, that it would have been helpful if you had listed all of those others that you now testified about? Wouldn't it have been helpful to put that in your prefiled testimony?
A Helpful to -- I'm sorry.
Q Well, helpful to this hearing to demonstrate, factually, all of the information that you had reviewed. Wouldn't that have been helpful to have put that in your prefiled testimony?
A Perhaps.

Q Let me ask you rather bluntly, Dr. Langhus: You didn't list these other items of review after you discovered that other experts in this matter had reviewed them, did you?
A Let me answer you bluntly: No.
Q All right. Dr. Langhus, would you agree with me that it would be important in this hearing and in this application to review as much accurate factual data concerning the Conroe oil field as possible?
A I would agree with that.
Q When we're talking about historical data, data that goes back, perhaps, 25 and 30 years, if not longer, is that information difficult to locate?
A Some of it is. A lot of it is not.
Q Okay. What are the means that you use or a person would use to locate historically accurate information concerning the geologic structure of the Conroe oil field?
A Basic data such as electric logs, wireline logs, well reports, well completion reports. Of course, reports and information at the Railroad Commission, the appropriate agency for storage of this data.
Q Let me ask you: Typically, what entity or entities would be the authors of that kind of

historical data concerning the oil field -- the Conroe oil field?
A It depends upon -- it depends upon the oil field, but in this case, the primary source of data would be either the Railroad Commission or Exxon -- Exxon, slash, Humble, the operator of the field since the '30s.
Q All right. The primary operator of the field -- not counting today, but, historically --
A Correct.
Q -- the primary operator was Exxon.
A Correct.
Q Would you agree, Dr. Langhus, that engineers, perhaps geologists, but individuals employed by Exxon might, in fact, be some of the most expert sources of information about features of the Conroe oil field?
A They would certainly be -- they would certainly be knowledgeable in the geology of the field, yes.
Q Exxon being the primary producer of oil in this field historically?
A Correct.
Q If Exxon experts, engineers, geologists, if they were not the best source of information, who would be?

A A disinterested third party, perhaps. Exxon frequently -- that is, all of the applications in front of the Railroad Commission was Exxon asking for something. I'm not saying that Exxon would shade the scientific evidence, but they might -- but they would probably present the evidence that was most sympathetic to their case if they're asking for relaxation of field rules or unitization, modification, this kind of thing.

Q Thank you, Dr. Langhus. And by the same token, if an Exxon report or if Exxon officials admitted or indicated problems, difficulties or challenges in the field, would that then enhance the reliability of such a statement?

A It could.

Q Dr. Langhus, let me ask you: In the -- in an oil field such as the Conroe field located in the Gulf Coast region, would you expect to find faults in such an oil field?

A Certainly.

Q I'm going to go out on a limb here with you, Dr. Langhus. Why would that be?

A The nature of the field itself is the salt core dome, domal feature, and, typically, in the Gulf Coast tertiary, you find patterns of faulting over

these -- over these domal features caused by the movement of salt, the upward movement of salt.

Q All right. Does that -- correct me if I'm wrong, but that upward movement of salt and that possibility or likelihood of faulting -- and tell me if I'm misstating here, but doesn't that really -- isn't that part and parcel of a likely oil field? Aren't we talking about a geology here that will likely produce oil?

A Certainly. Certainly. That's -- I don't have in front of me the statistics of how many salt domes in the Gulf Coast are productive versus dry, but I would guess it would be -- certainly a significant percentage of the salt domes are productive of oil and gas.

Q I'm not sure this is a good word, Dr. Langhus, but given that movement of salt and that possibility of faulting, does that make the subsurface, at least to a layperson like me, sort of a mobile subsurface as opposed to something certainly less mobile?

A If you're trying to compare the Gulf Coast tertiary to some place like Kansas, certainly the mobility of the rocks within the Gulf Coast tertiary is much higher, and that's certainly a characteristic.

There are salt domes that come to the surface where the salt is at the surface, in which case the seal -- any kind of sealing formations have been breached, and so probably that oil has leaked out, or a good deal of it. However, not all salt domes and not all domal features of salt are that mobile.

Q Okay. Thank you, Doctor. I appreciate that answer.

And certainly -- I think, perhaps, the information in front of us is that the Conroe field is one of these rather unique salt domes.

A Correct. It's a large -- a fairly large feature with a good deal of salt movement. However, the salt has not risen to the surface, and, indeed, the major sealing, trapping feature or trapping element, the Jackson shale, about 1,100 feet of good marine shale, is still intact. We know it's intact because there's 770 million barrels of oil that was withdrawn from the Cockfield in the Conroe field. If that shale trap had been breached in some way, there would not be that much oil.

Q Thank you, Dr. Langhus, and I would ask you to focus on my questions and try to limit your response to my question, but that -- thank you.

A I'm a frustrated professor, I guess. I'm

sorry.

(Laughter)

Q (By Mr. Walker) I'm familiar with --

(Laughter)

Q (By Mr. Walker) -- that. I think we're going to see another one before we're done.

A Very good.

Q Let me ask you: With respect to this particular application of TexCom Gulf Disposal for a UIC Class I disposal well, are subterranean faults an issue that merit serious consideration?

A Certainly.

Q And I'm going to ask you to lecture me a little bit here and tell me why they merit serious consideration.

A It's certainly possible that major faulting can be permeability barriers, both in a lateral sense and in a vertical sense. I had just -- just talked about the Jackson shale being a barrier to vertical migration, but faults can also be both a barrier -- either a barrier or an avenue of fluid escape.

Q All right. Thank you very much. That was going to be -- you sort of anticipated my next question. Faults could be barriers. They could be avenues of migration for fluids below ground.

A That's correct. I've seen both in the Gulf Coast tertiary.
Q Thank you, sir.
Let me ask you: You mentioned Kansas. And I don't want to get far afield here, but let me ask you if a subterranean structure -- and I use the word "mobile." You cited Kansas, but -- would a subterranean structure that was not as mobile, not like the Gulf Coast region, be an area that might have fewer faults or even the absence of faults?
A No. It depends upon where you are. But certainly in Kansas I have a fair amount of familiarity with that, a little bit more with Oklahoma, where the rocks are harder, are stronger, are older. You still have a -- you can have a high degree of faulting. You don't have any salt domes in Oklahoma, but -- or Kansas, but you do have movement -- subterranean subsurface movement that can cause a good deal of faulting in those situations also.
Q Very well. Thank you.
Well, let me ask you this: Is there an area of this country that you're familiar with that would have a lesser possibility of faulting or maybe virtually none at all?

A I'm from Minnesota, and I -- well, even there I've seen faulting, so -- I can't think of any. Some people try to say that the high level nuclear waste site in Nevada is devoid of faulting. We'll see, I guess.
I can't say. I can't say I know of a place in the world that does not have faulting.
Q All right. Fair enough. Let me ask you this: Are there places that have lesser degrees of faulting than, let's say, the Gulf Coast region?
A Certainly. Certainly. Areas that have a thin sedimentary cover -- the Dakotas come to mind where there's maybe only 5,000 feet of sediment, and it's old -- old sediment that faulting is not very common.
Q All right. And let me ask you for -- perhaps, for my benefit and maybe for those in attendance -- I'm going to try to make this a short question, but the -- would you agree with me that the entire premise of an injection well for deposit of non-hazardous but yet waste fluids, the entire premise is to shove that stuff underground and keep it there?
A That's correct. That's a major tenet of the underground injection program as part of the Safe Drinking Water Act of '77. Yes.

Q All right. So the idea, then, is to find a location, presumably, where you can pump this material to a subterranean location and where it won't move, and if you can find a place where it won't move at all forever at all, that would be good, wouldn't it?
A It would, especially keeping it out of sources of drinking water.
Q Very good. Let me ask you, Dr. Langhus, if you would look -- do you have your prefiled testimony in front of you?
A I do.
Q If you would, look quickly at Page 12.
A Yes, sir.
Q Starting at Line No. 9, the question was asked of you "What is the Conroe oil field," and your answer was "This giant oil field, which includes the area of the proposed wells, was discovered in 1931 and has produced more than 717 million barrels of oil through 1993."
A Correct.
Q Is that your testimony?
A Correct.
Q How would you characterize the Conroe oil field in comparison to other oil fields that have been discovered and produced in the United States?

A Certainly bigger than most.
Q Okay. Conroe field was a -- would you agree with me, it's an absolutely active producer of oil since 1930 up through -- well, maybe even today?
A It certainly is producing oil today. Not very much, but it is certainly doing that. Yes. So for the last 76 years.
Q I believe your testimony indicates that the field saw about 750 producing wells. Is that correct?
A That's one number I've seen.
Q All right. And I believe your testimony on Line 14, you've indicated that the vast majority of those 750 wells were drilled to a depth of approximately 5,000 feet.
A They were produced. They were producing from sands at approximately 5,000 feet.
Q Okay. You're making a distinction there. What would the drilling depth be, then, for those vast majority of wells? If you know.
A That would vary, but the majority of them were drilled just through the upper Cockfield, because that's where the production was.
Q All right. So -- and I would ask you, then: Is the upper Cockfield the upper area, I guess, that we are -- the highest, closest to the surface area

that is the -- I guess that we've been discussing in this hearing?
A It's the upper member of the TexCom injection interval -- or injection zone. It's not the highest hydrocarbons that are produced in the -- been produced in the field. Those continue to be the production from the Frio and the Vicksburg sands --
Q Okay.
A -- above the Jackson.
Q Thank you for that clarification, but the upper Cockfield is the upper member of the injection zone that's in -- listed in the application.
A Correct.
Q And the bulk of these 750 producing wells, is it your testimony they have penetrated into that upper Cockfield member?
A Correct.
Q So would it be fair to say, Dr. Langhus, that there are some 750 penetrations through the Jackson shale?
A Within the entire field, yes, 17,000 acres, yes.
Q Yes, sir. All right. Do you know, Dr. Langhus, how many wells have been located within the area of review listed in the application?

A Slightly more than 500.
Q All right. Of those 500, would all of them have been drilled down and through the Jackson formation?
A Not all of them, but the majority.
Q Majority of 500 drilled through the Jackson formation?
A Correct.
Q Now, then, with respect to -- let me back up.
Is it fair to describe these majority of 500 wells as what we call artificial penetrations?
A Yes.
Q So then we have some majority of 500 wells in the area of review that have penetrated through the Jackson formation?
A The majority, yes. Yes.
Q All right. Dr. Langhus, I'm not a scientist, but if you have some majority of 500 artificial penetrations through the Jackson formation, it sounds to me like that Jackson formation, at least to the extent of almost 500 penetrations, certainly can't be called impenetrable or impermeable.
A It's certainly an impermeable formation. There are certainly also artificial penetrations within it. Yes.

Q All right. Well, if I was to -- if I was to take a two-inch sheet of lead, solid, no holes in it, and pour water on it, would that water go through the lead?
A No, sir.
Q If I was to take that two-inch sheet of lead and take a nice, hard drill bit and drill, say, 400-some-odd holes through that lead and pour water on it, wouldn't the water go through it?
A It depends upon what you do with those holes.
Q Well, if I left them open.
A Yes, sir.
Q Thank you for that clarification.
Well, let's take that a step further. Let's say I drill 400 holes through that sheet of lead and 30 -- no -- 70 years ago filled them with something and I -- I'm dead now and I don't know what I filled them with and nobody else can tell me what was filled in those holes and maybe those holes are no longer filled. Would you expect that water to drip through those holes?
A I'd have to look at the records of those holes, determine what kind of a gun that you used to shoot through the lead or drill through it, and I'd have to look at -- candidly, I'd have to look at the

temperature at which you're keeping that sheet of lead. Lead has an awful lot of strength to it. Some formations in the Gulf Coast have strengths more like porridge.
Q Very good. Thank you, sir.
Dr. Langhus, if I may, let me direct your attention, also, to Page 12 of your prefiled testimony. Starting at Line 21, the question was asked of you, "Do you believe that an older oil field is an inappropriate place to site a UIC facility," and your answer -- the first part of your answer is "Not necessarily." Is that right?
A Correct.
Q And you've indicated, then, in the next sentence, "An older oil field can be a perfectly appropriate setting for a disposal project." Correct?
A That's correct.
Q Dr. Langhus, that appears to me to be a refreshing candor and suggests to me that an older oil field could possibly not be an appropriate location for an injection facility.
A That's true.
Q And, of course, the Conroe field clearly is an older oil field, is it not?
A It's older than most.

Q And in the area of review, there are some 500 artificial penetrations.
A That's correct.
Q And you've testified the majority of those penetrate down through the Jackson formation.
A That's correct.
Q Let me also ask you about -- again, on that page, the same response starting at Line 23, you've stated that an older oil field can be a perfectly appropriate setting when waste injection is engineered to be below most historical existing oil and gas production.
MR. RILEY: Objection. That's not the complete answer and actually was misread.
MR. WALKER: Thank you, Counsel. I'll be glad to read the entire sentence.
MR. RILEY: Thank you.
Q (By Mr. Walker) "An older oil field can be a perfectly appropriate setting for a disposal project, especially when waste injection is engineered to be below most historical and existing oil and gas production in the vicinity, as is the case with TexCom's project." That's your testimony?
A Yes, sir.
Q What do you mean with the phrase or the term

"when waste injection is engineered to be below"? What do you mean by that?
A Certainly the UIC program within the United States and certainly within the state of Texas has some engineering standards that must be adhered to when injecting waste, whether it's Class II saltwater waste or whether it's hazardous or non-hazardous as we're talking about this morning.
For instance, the -- any injection wells must demonstrate their mechanical integrity. They must demonstrate once a year that their casing is -- has integrity, doesn't have holes in it. And so what I mean is that you can't just have an open hole that you're running fluid into, that this has to be carefully engineered and monitored.
Q Carefully engineered and monitored if you're going to have an injection site in an older oil field?
A That would be prudent.
Q Would that level of prudence and care and technical care be as necessary in a location that was, quote, "not an older oil field"?
A No. The -- there are certain -- you probably should ask this of an engineer rather than an old-time geologist, but there are certain aspects of being in a producing field, that the producing wells can act as

sentinels to problems that are -- that could be happening downhole.
Q Ah, okay. That's good. Thank you.
MR. RILEY: Objection. He's interrupting the witness' answer. I don't believe the witness was finished.
JUDGE WALSTON: In all honestly, I think the witness' answer was going beyond the question, too, so --
MR. WALKER: Thank you, Your Honor.
Q (By Mr. Walker) I think I wasn't quite as clear on my question, Dr. Langhus.
I'm going to have to look at your response again. All right. This careful engineering and prudence that you just testified about that you think would be necessary and advisable for an injection site in an older oil field, would that same level of care and prudence that you're relating to a site in an old oil field be as necessary in a location that was no oil field, old or new?
A It could certainly be -- and, of course, there's prudence required any time that you're putting water -- or waste underground. And I'd have to say that the prudence and monitoring and engineering would be different in an oil field than in an area that has,

for instance, no artificial penetrations within the area of review.
Q Dr. Langhus, I truly don't want to dispute with you your testimony, but you've implied here on Lines 23, 24 and 25 on Page 12 that siting an injection well in an old oil field brings with it unique challenges of care and unique challenges of how to do it safely. And, clearly, the implication is that that might not be the case elsewhere. That's my question.
A And I'd have to say that it would depend upon the old oil field and the AOR that contains no wells. I'd have to say that they could be -- that they could require the same amount of prudence, of careful engineering. It all depends on the setting.
Q Let me ask you this: You agree with me, of course, that we have here in the area of review close to 500 artificial penetrations.
A Correct.
Q And we have here in the area of review -- at least my word was a mobile oil-producing region.
A Correct.
Q Isn't it true, Dr. Langhus, that a place -- regardless of how far away it might be, but a place that does not have almost 500 artificial penetrations

and a place that is subterranean -- not some mobile, old oil-producing region, wouldn't that be a better location for an injection well?

A I could certainly posit a situation in Oklahoma or Kansas that has a thin confining zone that, perhaps, since you have no -- no well control in your area of review could have geological holes in it. Maybe your shale that you're counting on for the confining zone goes to zero in some parts of that area, and if you have, say, a dozen water wells in that area of review that's within 100 feet of that so-called confining zone, this could be a problem. You don't want to have water wells acting as sentinel wells.

Q Thank you, sir.

Dr. Langhus, of the artificial penetrations within the area of review, how many, sir, do you know absolutely for certain to be permanently, properly and forever plugged so as to prevent upward migration of fluids?

A I guess I didn't quite understand that.

Q I'll restate. Of the artificial penetrations within the area of review, how many do you know to be properly, permanently, forever plugged so that upward migration of fluids won't happen?

A There's some -- there's certainly records within the Railroad Commission that lead me to think that there -- that these have been properly plugged, and given the -- given a certain amount of pressure increase within the injection interval, that upward migration of injectate, of non-hazardous industrial waste will not happen.

Q Thank you, sir.

And that's really the sum total of the application, isn't it, that mathematical calculations given in conjunction with the purported subsurface structure, that this math within that context is going to be sufficient to see to it that fluids don't migrate upward like they're not supposed to?

A Certainly the mathematics, the engineering is a big part of it, but I like the geology also. Having an 1,100-foot marine shale separating water wells from injection zone is a powerful argument.

Q And that 1,100-foot shale is the Jackson formation?

A Correct.

Q Wouldn't you agree with me, Dr. Langhus, that, really, we ought to be talking about a perforated 1,100-foot shale?

A Basically, yes, talking about a thick shale

that has some perforations in it.

Q Dr. Langhus, how many faults did you identify within the area of review -- subterranean fault -- no, no. I'm sorry. How many faults, total, did you identify within the area of review?

A Two.

Q Are they both subsurface faults?

A They both are -- involve the upper Cockfield; probably the lower Cockfield. So they're -- they are in the subsurface. Yes.

Q Very good. Thank you.

If, in fact, there are other faults within the area of review, would that be an important issue for you?

A It would depend on the evidence where it faults.

Q All right. If there was good evidence of other faults within the area of review, would that be an important issue for you?

A Yes.

Q Would it make any difference -- assuming that there are other faults, would it make any difference how many before it becomes an important issue?

A No.

Q Let me ask you this: If you found or if

there were found other faults in the area of review, would the issue become bigger or more important if the number of faults increased?

A There would be other factors that would be more important to me than the sheer number of the faults. For instance, in the 1972 Exxon-Humble submission to the Railroad Commission, there were -- in the highest Cockfield sand, there was something like 30 faults shown on their map that were in the AOR, at least 30. I went blind trying to count them all. But when looking at the individual faults, I could see that the offset was trivial or zero and that they did not persist into the deeper mapped horizons so that they didn't even persist throughout the upper Cockfield but were confined to only one or two sands. So in that case, there was a large number of faults, but the evidence for each one was limited.

Q Would you agree or disagree with the statement, Dr. Langhus, that the Conroe field is a highly faulted field?

A I'm not sure what "highly faulted" means. There's certainly faults within it. I can't agree with "highly faulted."

JUDGE WALSTON: Did you say can or cannot?

A Cannot.
Q (By Mr. Walker) Let me ask you that question, perhaps, with just a twist. If Exxon engineers, geologists, employees of Exxon who produced this field described the Conroe field as a highly faulted field, would that be of interest to you?
A I've seen that in the Exxon submittals to the Railroad Commission, and I'm not sure -- you know, that's like saying it's highly humid outside. It depends on what you're comparing it to. If you could say that there's -- that there are a number of faults per square mile, then I could agree with that number, and I would still have to have the evidence for the faulting, whether it's just interpretational or whether there's a fault cut in a well.
Q Let me ask you, Dr. Langhus, I think you made reference to the -- is it an Exxon hearing before the Texas Railroad Commission from 1979 entitled "Application of Exxon in Conroe Field, Texas Railroad Commission Oil and Gas Docket No. 03-7604 and No. 03-71097, January 1979"? Are you familiar with that report?
A Yes.
Q Do you recall a quote from that report, Dr. Langhus, that goes as follows: "Hydrocarbon and

water movement across faults is still a very real problem"?
A I do remember something much like that. I can't remember the exact words, but yes.
Q Dr. Langhus, let me direct your attention to Page 22 of your prefiled testimony. I believe your answer that starts on Line 12, you say, that, yes, the thick 1,000-foot marine mudstone of the Jackson formation constitutes an ideal confining zone to seal any faults, fractures and joints that might propagate upward from the deep sediments draping over the salt piercement structure. Is that right?
A Correct.
Q Dr. Langhus, how many artificial penetrations through the Jackson formation would prevent it from being considered an ideal confining zone?
A It would depend on the artificial penetrations and what was done to those wells, whether or not they were plugged with mud, plugged with cement, whether they were cased, all of these things.
Q All right. If I understand your answer, then, Dr. Langhus, the integrity of those artificial penetrations would have a direct bearing upon the status of the Jackson formation as an ideal confining zone.

A Depending upon the nature of the pressure increase brought about by the injection of non-hazardous waste.
Q All right. Well, let's talk about the Jackson formation as an ideal confining zone. Would you agree with me that if it suffered no artificial penetrations its status as ideal would be much clearer?
A Certainly.
Q And if it has suffered some 500 artificial penetrations within the area of review, then that status of ideal now must depend upon the nature of those penetrations.
A Exactly. Exactly.
Q As far as you know, Dr. Langhus, has there been -- and this may sound like a silly question, but I'm going to go with it. Has there been any independent effort aside from review of records to determine the integrity of those 500 artificial penetrations?
A I could say that it happens every day within the production of the current Conroe unit operated by Wapiti Energy, the successor of Exxon, that they should certainly be able to see whether or not there are -- there's saltwater or whether or not there is

hydrocarbons leaking up into their producing -- or producing and disposal zones within the Vicksburg and Frio on top of the Jackson.
Q Very well. So if I understand your answer, then, Dr. Langhus, you're saying that the evidence of integrity or lack of integrity of these old 500 or so penetrations is really dependent upon information that might voluntarily be provided or discovered by the current producer.
A They might voluntarily produce the knowledge. More than likely, however, they would go to the area where they expect to see some fluids coming up from the deeper horizons and they would remediate those wells that are, perhaps, unplugged. That would be the prudent thing for an operator to do.
Q Okay. If I understand your response to that question, then, it sounds, to me, like you're saying that the determination now of the integrity -- excuse me -- the determination now of the status of the Jackson formation as an ideal confining zone is dependent upon the integrity of some 500 artificial penetrations which is going to be -- or should be monitored and reported by some third party not a party to this proceeding.
A If the pressure increases within the lower --

within the lower Cockfield injection interval, if those pressures are high enough to cause transmission of pressure or even transmission of waste up to the Jackson, then, yes, it would be. Then I would guess that responsibility for that kind of monitoring and remediation of the boreholes would devolve to TexCom.

MR. WALKER: Your Honor, I will pass the witness.

JUDGE WALSTON: Okay. Any questions from the Individual Protestants?

MR. FORSBERG: Yes, Your Honor.

JUDGE WALSTON: Okay.

CROSS-EXAMINATION

BY MR. FORSBERG:

Q Dr. Langhus, my name is Kevin Forsberg. I have just a few questions for you this morning.

Are you familiar with a document or publication called the Atlas of Major Texas Oil Reservoirs?

A Yes, sir.

Q Is that a document you reviewed when you were looking at the Conroe oil field in regards to this application?

A Yes, sir, I did.

Q Okay. And do you find that to be a reliable

source?

A It's a good source to start with.

Q Is it cited in any of your materials that you produced?

A I don't think so.

Q Okay. Are you familiar with any of the conclusions or statements that that publication makes with regards to faulting in the Conroe oil field?

A I don't recall.

Q I'm going to read you a statement. I'm just going to ask if you agree or disagree with this statement. "The main Conroe sand is actually several sands separated by shale beds." Do you --

A Certainly.

Q Do you agree with that statement?

A Yes.

Q Okay. "Extensive faults allow pressure equalization between reservoirs and gas gap leakage into the upper Cockfield sands."

A Again, "extensive" is like "highly faulted." I can't agree or disagree with it.

Q Okay. But as you sit here, you don't have any reason to disagree with it.

A No. It's just an inflammatory term that does not seem to be very scientific to me.

Q Okay. Well, if you take the word "extensive" off and you just say "Faults allow pressure equalization between reservoirs and gas gap leakage into the upper Cockfield sands," would you agree with that?

A That's been demonstrated.

Q Okay. So the liquids from the lower sands can come up into the upper Cockfield sand?

A No, no. No. The migration -- vertical migration is all within the upper part of the upper Cockfield so that we're talking about 150 feet or 200 feet of migration. We're not talking about 1,200 feet of migration bringing fluids and hydrocarbons out of the lower Cockfield. This is in the oil field itself, which is in the upper Cockfield.

Q Okay. And to get a couple of terms just clear in mind, in the UIC applications pending, the injection zone is the entire Cockfield formation.

A That's correct.

Q That's lower, upper and middle?

A Excuse me. Yes.

Q Okay. And then that is -- and then right above that is the Jackson formation.

A Yes, sir.

Q Which is approximately 1,200 feet.

A 1,100. 1,080 or something.

Q Okay. And directly above that is the Catahoula.

A It's the lower Catahoula, and there at Conroe, that consists of the Vicksburg sands sitting on top of the Jackson. And then above that is the -- are the Frio sands.

Q Okay. In the application pending filed by TexCom, is the entire Catahoula down to 4,088 feet defined as an underground source of drinking water?

A Yes. I put that down there --

Q Thank you. I think that's -- my question was answered.

In your amended or corrected prefiled testimony -- do you have that in front of you?

A Yes.

Q You identify a buffer zone of approximately 2,800 feet to 4,000 feet below the ground.

A Correct.

Q Is it -- do you believe it's appropriate to define a buffer zone that is completely contained within an underground source of drinking water?

A I do.

Q Is that underground source of drinking water potentially usable in the future?

A No, sir.
Q Why not?
A Because the -- this buffer zone, this part of the Catahoula has been historically productive of oil and gas and is currently being -- and has historically been used as a disposal zone by Exxon and by Wapiti for disposing of saltwater produced from oil and gas wells in the Conroe field. So it's a -- although it meets the statutory definition of a USDW, that is, the water in it seems to be less than 10,000 parts per million, it is certainly not a source of -- not current source of drinking water and not in any shape or form a future source of drinking water. It would be so expensive to remove the trace amounts of oil or -- and the high salinity.
Q That's based upon your understanding of current technology in regards to cleaning water or filtering water.
A It is.
Q It's quite possible, though, that if water runs short, that technology may advance and we may have to tap into that source of water.
A Of course, anything is possible, but looking at the Safe Drinking Water Act program, and especially the UIC, the US EPA has granted -- and so has the

TCEQ, granted exemptions from USDW status for reservoirs like this that have historically produced oil and gas, and, therefore, have made them unusable water.
Q Is there such an exemption in place for this area?
A No. I don't think anyone has required it of either Exxon or Wapiti.
Q So as we sit here today, as the application that TexCom filed states, down to 4,088 is an underground source of drinking water.
A It's a USDW, yes.
Q Which is an underground source of drinking water.
A Correct.
Q And you are testifying that the buffer zone, which I believe would be required by Texas Administrative Code Chapter 30 Section 331.121(c)(4)(A) as stated in the question, is within the underground source of drinking water?
A That is correct.
MR. FORSBERG: Okay. That's all I have. Thank you. I pass the witness.
JUDGE WALSTON: Okay. Public Interest Counsel?

MS. COLLINS: No questions.
JUDGE WALSTON: Executive Director.
CROSS-EXAMINATION
BY MR. WILLIAMS:
Q Good morning, Dr. Langhus. My name is John Williams.
A Good morning.
Q I represent the Executive Director.
You mentioned one of the projects you worked on was Pilgrim's Pride injection well.
A Correct.
Q Just as a clarification, you said Pittsburg County. I'm not certain there is a Pittsburg County in Texas. Could it be --
A It's near the town of Pittsburg.
(Laughter)
Q (By Mr. Williams) Near the town of Pittsburg.
In your testimony -- and Mr. Casey punted to you yesterday, you mentioned a number of times the formation spelled Capital Y-e-g-u-a.
A Yes, sir.
Q And is that pronounced Yegua?
A Yegua.
Q And is that the same as the Cockfield?

A Locally, on the Conroe field, it is the same. Yegua is a regional term, just like Jackson formation is a regional term that extends over most of the Gulf Coastal Plain.
Q Good.
A And, locally, it's called the Cockfield.
Q So we can depend upon -- if we see "Yegua" in any prefiled testimony or exhibits that come in for this case, we can -- we can assume that it means the Cockfield.
A Yes, equivalence.
Q Equivalence.
The surface faults, did you find any surface faults in this area?
A No.
Q So those faults that we're talking about in the Cockfield are strictly subterranean and are not manifested on the surface. Is that correct?
A That's correct.
Q Does that indicate that the salt dome is still growing or not?
A It would suggest that it's not growing.
Q So it is no longer mobile?
A The salt, yes.
Q Correct.

A That's right.
Q Okay. Mr. Forsberg quoted a passage about extensive faulting allowing pressure equalization within the oil strata. Does that indicate that the faults that you located are laterally transmissive?
A No.
Q No. Are any of the faults laterally transmissive in the area?
A I would say that two faults that I mapped are.
Q Okay. Are they vertically transmissive?
A I think they are.
Q Okay.
A But, now, that -- if I may, that depends upon where in the section that they cut.
Q Okay.
A And in order for a fault to be open, transmissive, there has to be a lot of sand on both sides of the faulted horizon. If there's too much shale -- and by "too much," I mean 25 percent -- then it tends to smear across the fault.
Q Okay. Mr. Walker -- I was getting confused with Mr. Walker's questions to you about old and new oil fields, because what I thought I saw in your prefiled -- what did you understand Mr. Walker to mean

when he was asking you about old and new?
A Well, he was -- the way I understood it, he was talking about the relative risk to UIC projects in an old field versus a new field.
Q Old as in geologic time or current or 20th century production?
A No. Old in terms of -- yeah, oil field production.
Q Okay. So it's not an old field would be one back in the '30s as opposed to today, not one in the permian as opposed to the tertiary.
A I understood that it meant "When did the drilling take place?"
Q Because I thought you were referring to old geologic oil fields in your prefiled.
MR. WILLIAMS: Okay. That's all of the questions I have, Your honor. Pass the witness.
JUDGE WALSTON: Redirect.
MR. RILEY: Yes, please.
May I approach the board?
JUDGE WALSTON: Yes.
REDIRECT EXAMINATION
BY MR. RILEY:
Q Dr. Langhus, if you'll help me draw a few hypothetical features on my hypothetical diagram

that's been previously marked as TexCom Exhibit 68.
We've been talking a good portion of this morning about faults.
A Right.
Q And I think I heard at least one reference in your discussion of faults to major -- or maybe it was minor, but either way, you distinguished between faults as having a different level of significance.
A Right.
Q Could you explain a little further?
A A significant fault, to me, means one that has a large vertical offset on either side, that it has well control -- either that, or if there's no well control, seismic control, something that will locate the location of that -- pin down the location of that fault, and that it is -- that it replicates itself in several mapped horizons.
Q In your some 40 years of experience, have you ever disagreed with another geologist of their interpretation of geologic data?
A That's how you define a geologist, one who disagrees with another geologist.
(Laughter)
Q (By Mr. Riley) I think I did find that in the licensing requirements.

(Laughter)
Q (By Mr. Riley) The methodology you employ -- and you just explained a bit about distinguishing between major and minor faults. In this particular case, did you identify any faults in the area of review that you consider to be -- one, to be faults and, two, to be major faults?
A Yes, the two faults that I put on my structure map of the upper Cockfield. One is just to the south of the center of the AOR. It's about 4,400 feet south of the center. And then another one at the southern edge of the AOR. Both of these have significant offsets, 150 to 200 feet of offset. They're cut by several wells so that there's a precise location of the fault, and they have -- virtually every map within the area, at least looking at the Exxon submittals to the Railroad Commission, have reproduced those faults.
Q Okay. I'm going to attempt to draw an example of a fault on TexCom Exhibit 68, and by no means do I intend it to be an accurate depiction of true geology. It's just for representative purposes, but I need your help.
So I'm going to start with: If a fault is found, is it your experience that faults are --

occur at 90 degrees? In order words, should I draw a perpendicular line to the plane of the formation?
A Not in the Gulf Coast tertiary. There's usually a significant slope to the fault. I've seen Exxon refer to 61 degrees. That's a reasonable number. And it would be sloping toward -- as you go down, sloping towards the downthrown side of the fault.
Q Okay. I knew this was going to be more complicated than I imagined, but which side -- let's say this is the proposed well location. I don't mean to represent any distance or draw this to scale, but this well that I drew earlier is the well that has been identified as Waste Disposal Well 315.
A Correct, and it is vertical, yes.
Q And so the strata that I've drawn, would they be perpendicular to the wellbore or are they likely to be sloped or do they have a slope to themselves?
A A very slight slope, essentially at right angles to the borehole.
Q Okay. So that's a fair estimation?
A Certainly.
Q Now, you mentioned that a fault in this area would likely have a slope.
A Right.

Q And that means one side -- a higher layer would have -- if you looked at it on a plane --
A Right.
Q -- a two-dimensional plane and you found the fault and then you looked at another two-dimensional plane lower, you would find that plane in different -- or that fault in different spots. Correct?
A Yes. Yes.
Q And what I'm imagining in my head, at least, is a slice across the fault that you can look at from a bird's eye view and it -- look at it from a bird's eye view and have two slices. Even though it might be the same fault, it would be at different locations.
A Correct.
Q Because of the slope.
A Correct, if they were separated by sufficient vertical distance.
Q Okay. So which -- regarding the closest fault, which I believe Mr. Casey testified is 4,400 feet or in that order to the south of the wellbore location, is the stratum toward the wellbore on the upthrown or downthrown side?
A The higher strata, such as the upper Cockfield, that fault would be shown closer to the well than the lower Cockfield.

Q Okay. So -- and I may have confused you or confused myself. There's upthrown and downthrown --
A Correct.
Q -- on either side of the fault.
A Correct. On your cartoon, the downthrown side is to the right.
Q So -- I'm bad with left and right, but I'm going to write on my right -- correct --
A Correct. Correct.
Q -- is the downthrown side?
A Correct.
Q Is it fair to represent it with just the letter "D"?
A Exactly.
Q And then am I correct, also, that the left-hand side would then be the upthrown side?
A Correct.
Q Should I use the letter "U"?
A Correct.
Q Now, I did not mean to imply by where I drew the upthrown and downthrown side that the fault you described in the application enters the Jackson shale or anything more. I'm just showing the relative terms.
A Right.

Q If I understood, then, correctly, the fault, looking on a two-dimensional plane at a stratum -- well, the slope would be toward the left or toward the right?
A As you go downwards, towards the right.
Q So I would -- I'm going to draw it below the Jackson shale.
A We know that it -- or we're pretty sure that it cuts the base of the Jackson shale.
Q How far into the Jackson shale would you say?
A Quarter of an inch.
Q Quarter of an inch. And what would that represent in terms of feet in your opinion?
A Around 100 feet.
Q And I'm not going to even attempt to draw 61 degrees, but --
A Right.
Q -- I'll just draw a slope. How far -- how deep should I go?
A Perhaps to the Cockfield shale. Like that.
Q Fair enough so far?
A (Witness nods head)
Q All right. And let me just extend the lines of the pre-drawn formation out, then, to that fault. Is that --

A Correct.
Q -- appropriate?
Okay. Now, on the downthrown side, am I correct that I would draw those same lines representing the various formations lower --
A Correct.
Q -- on the board than on the upthrown side?
A Correct.
Q Okay. What is the offset or the -- what is the distance, the fault, in your opinion?
A They do vary somewhat, but in the upper Cockfield, the offset is about -- is between 150 and 200 feet.
Q Okay. So I'm going to try to represent -- how thick is the upper Cockfield?
A 300 feet.
Q All right. So if I drew it about the middle of the upper Cockfield, that would be a rough --
A That would be pretty close.
Q So that means that the Jackson shale has dropped down, so to speak, into the sand layer of the upper Cockfield. Is that correct?
A Correct. Correct.
Q So if I write "Jackson" over here on this side, is that correct?

A (Witness nods head)
Q And before we go lower, could you explain why I shouldn't continue with the fault line up to the top of the Jackson shale?
A There's no evidence for it and the shale itself is -- has such -- has such low strength that I would be -- I would be amazed if the fault could propagate through the shale.
Q You mentioned -- I think you used the term "well control." What are you referring to when you talk about "well control"?
A For a fault, well control by -- I mean -- "well control," that a well has cut the fault, and so you can see that there is a certain amount of vertical section that's missing in that fault.
Q All right. So if I -- again, just, hypothetically, if I had a well, say, on the north side of the fault and a well, say, on the south side of the fault, would I find differences in the wellbore in terms of geology?
A You wouldn't -- it depends on the age of the faulting, but you wouldn't normally see differences in the geology on either side unless the fault cut -- unless the fault was cut by the well.
Q Okay. And "cut by the well" is what I'm

struggling with. What does that mean?
A Well, if you had a vertical well, say, between the U and the D, it would presumably cut that fault somewhere in the middle Cockfield, and so --
Q Okay. So it would actually cross the fault?
A Right. Right. So it would go from the downthrown side to upthrown side and there would be something like 150 or 200 feet of section missing.
Q All right. And in this field, is there well control?
A There is. On these -- on the two major faults, yes.
Q Okay. Well, could you explain a little bit further what you looked at and what you're referring to?
A These were fault cuts either noted by Exxon on wells or actually seen by me in looking at well logs.
Q Okay. So that information gave you confidence that the fault I've drawn or depicted on this diagram actually is there and exists?
A Correct.
Q And I think you've explained at least why you think it doesn't penetrate the Jackson shale. Could you go over that again?

A It's a matter of strength of the shale. The shale itself has a consistency. It's not a rock; it's a semisolid material. And it does not have the strength to propagate a break such as a fault.
Q There are regions of the country -- you were asked a number of questions about different regions of the country being better or worse suited for a UIC well. So that leads me to believe you've had experience in the field of geology in other areas of the country.
Are there different types of rocks that would propagate a fault up to different layers or two different layers?
A Certainly. Certainly. An older rock such as the Permian that Mr. Williams was talking about -- the Permian of the Texas Panhandle, those are real rocks, and they have the ability to propagate faulting for many hundreds and perhaps thousands of feet.
Q And I think geologists sometimes appreciate rocks different from other folks. If I held a piece of the Jackson shale in my hand, would I think of it as a rock or would I think of it as a porridge-like substance?
A If it was a fresh piece right out of a core, it would -- you would think of Play-Doh.

Q And you've mentioned earlier in someone's questioning that this material can smear or -- I think that's the term you used.
A Correct.
Q Is that correct?
A Correct.
Q And what significance does that smearing effect have?
A Well, if there's sufficient shale on both sides -- or on either side of the fault, the clay material within the shale will smear across the fault plane, and that smearing will, of course, retard any kind of transmission of fluids through the fault plane.
Q Let me go down to some of the other layers here and see if I can illuminate that a little further.
Mr. Casey talked about a shale layer between the upper and the middle Cockfield -- well, before I go on. Do you know the depth or -- excuse me, the width -- wrong term -- thickness of the Jackson shale in the area of review?
A 1,088.
Q 1,088 feet?
A Yes.

Q So if I've drawn in that dimension for the Jackson shale in my cartoon, which, I've got to tell you, I don't like that term, but I'll call it that --
(Laughter)
Q (By Mr. Riley) -- that is a fair representation of the thickness of the Jackson shale in your opinion?
A In the WDW-315.
Q All right. And that's from an actual analysis or evaluation of the boring log.
A Right.
Q Is that correct?
All right. Moving down to the shale layer between the upper and the middle Cockfield -- first of all, do you agree that it exists --
A Yes.
Q -- through the shale?
A Yes.
Q And do you have approximation or --
A 30 feet.
Q 30 feet. It's a little hard to draw in here, but -- and I'm going to represent that on the downthrown side of the fault, just for representation purposes, throughout the middle of the middle Cockfield.

A Right.
Q Is that correct?
A Right.
Q How thick is the middle Cockfield?
A It's approximately 400 feet.
Q And I didn't ask you -- or maybe I asked you but I didn't write it down, how thick is the upper Cockfield?
A About 300 feet.
Q And this is all from your analysis or review of the boring logs?
A Correct.
Q And, finally, is it okay for me to just draw the other layers, then, sequentially --
A Right.
Q -- as a representation?
In a crude, lawyer fashion, have I developed a reasonable depiction of what you as a geologist would say is an approximation of the stratum that we've been discussing?
A Yes, sir.
Q Now, with respect to the shale layer -- the 30-foot shale layer between the upper and the middle Cockfield, could that shale layer -- or would it be appropriate to discuss smearing in the context of that

shale layer?
A I don't think so. That's a fairly minor -- the 30-foot shale in comparison to 300 feet or 400 feet of sand is not -- I don't think that's a major force in affecting the permeability.
Q All right. I think I asked also, but I didn't write it down again, the throw of this fault is approximately?
A Between 100 and 150 feet.
Q I'm going to try to represent that here by writing sideways.
Is that -- are you at least able to follow what I'm trying to depict --
A Yes.
Q -- on the diagram?
All right. So now we have the first fault we come to in your analysis -- and is that the most significant fault or considerations that we've been discussing in this case?
A Yes, sir.
Q And is it your opinion that the fault that I've depicted, this is 4,400 feet from the Waste Disposal Well 315?
A Correct.
Q I'm going to write that down.

(Brief Pause)
Q (By Mr. Riley) Fair?
A Uh-huh.
Q All right. Now, you heard Mr. Casey testify that the plume radius, considering that fault is transmissive, would extend to 2,770 feet and that he considered that the conservative way to model the reservoir considering the permeability -- relative permeabilities of the other sands.
A Correct.
Q And do you agree with that?
A I do.
Q Now, am I correct, then, that under that modeling, at least, the plume radius does not reach the 4,400-foot fault?
A Correct.
Q And that's a plume radius of 30 years. Correct?
A Correct, assuming 24/7 operation, et cetera.
Q With all the conservatisms that Mr. Casey discussed in his modeling?
A Right.
Q Now, if I'm also correct, the -- we had six wells in the cone of influence. From a geologist's perspective, could you explain the significance of a

cone of influence for purposes of your evaluation of this application?
A What I looked at was the cone of influence and the -- as being the -- that part of the area of review that -- with some extremely conservative assumptions, that this would have the sufficient pressure build-up within the lower Cockfield that it would be able to begin to break down mud plugs in old boreholes. And so that's what -- that's what I looked at -- that's what I look at when I look at a cone of influence.
Q All right. And as I've written up here, according to Mr. Casey's analysis and all the things that have been discussed with Mr. Casey and your previous answer, the cone of influence is 750 feet. Correct?
A Correct.
Q Am I correct, then, based on -- well, let's go a different direction for a second.
There were questions about the history of the Conroe formation, I believe, by -- primarily by Mr. Walker about the age of the field, "Is it an old oil field," and there were a variety of questions there. But somewhere in that discussion you explained that your confidence regarding the confining nature of

the Jackson shale is enhanced or I guess verified by the history of oil production in the Conroe field. Did I understand that correctly?
A Correct.
Q Could you explain that further?
A Although the Conroe field is an old field in terms of some kind of -- some kind of context -- it's older than me, for instance.
(Laughter)
A But it's not as old as other fields in Texas or in the United States, and so there's -- there are certain advantages to that. For instance, the fact that casings -- surface casing and production casing are oil field steel -- they're not wood, for instance -- that by the '30s cement was used throughout the oil business for plugging old wells and for setting casing. Mud was used in the drilling of mud -- of holes. There -- in this area, anyway, cable tools were not used. So there's a number of advantages.
For one thing, they -- by this time, the state government had made them survey the locations of the wells; whereas, in the teens, it was kind of, "Well, it's somewhere over here" sort of thing. So there's a real advantage to old fields that are only

as old as the Conroe.
Q So by the '30s, there were -- there was some level of sophistication to the oil business even back in those days?
A I don't know if I'd say "sophistication," but, yes, there was certainly a degree of practice.
Q And I think somewhere in the discussion with Mr. Walker he talked about having -- the field having a common operator for some number of years.
A Correct.
Q Could you explain further what that means?
A Well, in the early part of the -- it was discovered by -- in 1931 by another operator, but very shortly after that, Humble was able to assume most of the operations within the field. And sometime in the early '70s, the field was unitized with Exxon as the operator over the whole field.
Q And how would common ownership or control factor into the discussion you were having with Mr. Walker about the artificial penetrations and the reliability of records? If you have an opinion.
A My opinion -- my history is that if there was a common operator, then the integrity of the records would be maintained a great deal more than if the field was changing hands every two or three years

among smaller companies.
Q So ExxonMobil Corporation, I believe it's called now, until very recently, tracing back to Humble Oil Corporation, was a continuous ownership. Is that --
A Correct.
Q -- your understanding?
A Correct.
Q Back to geology. Am I -- did I understand correctly that -- well, let's go to a different topic for just a second.
Did you hear the discussion that I had with Mr. Casey this morning regarding the fall-off test?
A Correct.
Q And what is your understanding of the parameters of fall-off test, how it's done and what it can demonstrate?
A Being a geologist, I don't have -- I've got some experience with fall-off testing, but I do not have the ability to manipulate that data to make any inferences myself. But in my years in the oil business, I have seen them used not only to get -- to get a different look at permeability, at average permeability within a zone. That is, commonly, I work

with wireline data that sometimes has permeability data on them and frequently with core data. But cores are usually very short and wireline data is -- usually has its own limitations.
So I can say, for instance, that in a certain part of the second upper Cockfield sand, that that, locally, has a permeability of 900 millidarcies because there was a core cut there, but the rest of the sands in the Cockfield I really don't know about because I don't have any core there. Well, a fall-off test can give you some averaged -- some cumulative information over a longer interval.
Q And you heard the discussion about the penetration that TexCom plans to make as different from the fall-off test -- or excuse me, the penetration that was present at time of the fall-off test that's been the subject of some discussion in this case.
A Correct.
Q How about the portion of Mr. Casey's testimony regarding the investigation distance from the wellbore in the fall-off test? Do you have --
A Yes --
Q -- any experience in that regard?
A -- I have, and I've seen some fall-off tests

that give good corroboration to geological features that I've mapped.
Q And at least as it pertains to this single fall-off test which Mr. Casey said indicated -- or did not indicate -- I'm struggling for the words, but did not indicate faulting or an obstruction or something of that nature, that that was some -- that went out 1,500 feet from the wellbore.
A Correct.
Q And that's consistent with your analysis of the faulting in the area?
A It is.
Q The fault that we've been discussing and I've depicted on the diagram 4,400 feet away from the wellbore, WDW-315, let's talk about it in terms of hydrocarbon production in the field. Is there some significance to the fault that you've -- in other words, let's talk about artificial penetrations. As it pertains to oil and gas production in the Conroe area, are there more or less oil and gas penetrations to the south of the fault?
A There are more.
Q And so if I -- and the south is to the right-hand side of the page. Is that correct?
A Correct.

Q Let me write "South." And "North," I'll just write on the left-hand side.
And what is your opinion as to why that might be, if it has any bearing at all on the fault that we've depicted?
A Whether or not it has anything to do with the fault or not, but it's -- the culmination of the dome, the highest part of the dome is to the right of the map. It's south of the AOR, area of review, and so the -- just the natural buoyancy of the oil and gas floating on top of the saltwater that's in all of those sands would force the oil towards the culmination of the structure.
Q Okay. So if I write underneath "South Dome" and put an arrow to the south. Is that --
A That would work.
Q -- fair?
A (Witness nods head)
Q Does that mean that there wouldn't be oil and gas production to the north of the fault that we've been discussing?
A No, and there has been historical production to the north.
Q Okay. And in relative terms, though, where did you see more wellbores, to the south or to the

north?
A To the south.
Q Even within the area of review?
A I'm not so sure of that. There isn't a lot in the area of review that's south of the fault.
Q And so, at least in your recollection, the oil and gas production occurred in the area farther to the south -- or the bulk of it?
A Right. Within the field itself, yes.
Q Okay. The --
MR. RILEY: Is this a convenient time to stop for lunch? I'm going to go to another topic and it's about ten 'till 12:00.
JUDGE WALSTON: That will be fine, but let's try and keep it to an hour. So we'll go off the record and if we can come back at ten 'till 1:00. We'll resume at ten 'till 1:00.
(Recess: 11:47 a.m. to 12:50 p.m.)

AFTERNOON SESSION
(12:50 p.m.)
JUDGE EGAN: All right. We're going back on the record. It's about 10 till 1 on December 13, 2007, and, Dr. Langhus -- is that how you say it?
WITNESS LANGHUS: That's correct.
JUDGE EGAN: You're still on redirect. Mr. Riley, are you ready to proceed?
You said there were a few housekeeping matters. Do you want to do those first?
MR. RILEY: I would prefer since I have them in my head.
JUDGE EGAN: That's fine.
MR. RILEY: The first one is from this morning. We had an exhibit, TexCom Exhibit -- from the Railroad Commission certified records.
JUDGE WALSTON: 69.
MR. RILEY: I believe it's 69. We have made copies of that exhibit and distributed those just a few minutes ago. That item is taken care of.
And then yesterday there were two items that we said we would like to review and would get back to the Judges on whether we had an objection. I think we called it subject to verification.

JUDGE EGAN: It was Lone Star Exhibit 17, 18, and actually, 19. There were three.
MR. RILEY: One, if I'm following along correctly, I believe 17 was the docket sheet from the engineering board.
JUDGE EGAN: Yes.
MR. RILEY: And we have verified that that is, in fact, from the engineering board, so we withdraw any remaining objection to that.
JUDGE EGAN: Thank you.
MR. RILEY: 18 is a -- some documents that were produced which are entitled Reservoir Modeling with a blank cover sheet on the front. Again, that is verified that was produced in our document discovery.
JUDGE EGAN: The April 12th letter from TCEQ is Lone Star No. 19. Do you still need more time for that one?
MR. RILEY: Apparently so.
JUDGE EGAN: All right.
MR. RILEY: I didn't have that one as still in question. That's the TCEQ letter?
JUDGE EGAN: Yes, the April 12th, 2007 letter from TCEQ. And that's all I had that you needed to have verified.

Are you ready to proceed with your redirect?
MR. RILEY: Yes, Your Honor. Thank you.
JUDGE EGAN: Go ahead.
PRESENTATION ON BEHALF OF THE APPLICANT
(CONTINUED)
BRUCE LANGHUS,
having been previously duly sworn, testified as follows:
REDIRECT EXAMINATION (CONTINUED)
BY MR. RILEY:
Q Good afternoon, Dr. Langhus.
A Good afternoon.
Q I would like to start this afternoon's discussion about the materials you reviewed as part of your preparation of your geologic portion of the TexCom application as well as some terms you used, or I think would be helpful to the Judges to describe in this case.
So the first one I would like to begin with is horizon. I know you were asked questions about certain fault information, and I believe you referred to "horizon" as -- in one of your answers. What is a horizon and what are you referring to?
A A horizon is a surface contact, such as the

lower contact of the Jackson shale where it touches the upper Cockfield would be a horizon.
Q And those horizons are mapped on occasion. Is that correct?
A Yes.
Q And that's one way of indicating a fault, is showing a horizon and a fault on a horizon?
A Correct.
Q And if you took a certain horizon map -- is that a three-dimensional picture or is that a two-dimensional picture?
A It's really just a two-dimensional picture. The horizon doesn't have thickness.
Q So if I looked at a bird's eye view, again, and let's say for purposes of our discussion we're looking at the area of review, and I look down as a bird might, and I could see through the earth; of course, that would be another requirement, and I look into a certain depth, that would be a horizon, and I would see a line across that horizon which could be indicative of a fault?
A Correct.
Q And is that the type of information that you reviewed and you referred to in your cross-examination as some of the Exxon mapping, some of the other maps

you've reviewed?
A Correct.
Q Now, are there -- is there information that you reviewed in this case that indicates a horizon was mapped and indicated a fault line or a fault, and then another horizon was mapped and did not indicate that same fault line or fault?
A Correct.
Q And could you explain to the Judges what that might indicate or what in your opinion it would indicate?
A What that indicates is that the geologist making each of those maps made an interpretation from his data and interpreted, or did not interpret, a fault, because a great many of these faults are interpretive; that is, they don't have -- they don't have hard evidence for their location and vertical offset.
Q Can we use the term "interpretive fault"?
A Yes.
Q Is that something that you've heard in your profession?
A Yes.
Q And are there various ways for geologists to look at a set of data and interpret that there is

potentially a fault in an area?
A Yes.
Q Could you explain those to the Judges?
A The easiest way to explain it is if I have a map that has a great deal of well control on it, that is, it has information as to the depth of a horizon, like the top of the upper Cockfield, I would then contour that to come up with a structure map, and if I see strong contrasts in that contour map, I might want to interpret a fault, or I might not want to interpret a fault based on my experience and my interpretation of the rest of the information in that area.
So if I knew, for instance, that this part of Kansas had a lot of faulting, I might want to put in a fault. If I knew, on the other hand, that this was -- that this was quite a quiescent part of Kansas and nobody else had interpreted a fault, I didn't have any seismic that showed a fault, I would then contour it differently.
Q And you're using Kansas as a hypothetical, in case folks have joined us this afternoon and think we're talking about a well in Kansas.
A Right. Right.
Q The issue then is you can look at the same data and knowing something else about the geology, a

geologist might make an interpretation of a fault, whereas another geologist might see it differently or not agree that there's a fault?
A Exactly.
Q And the -- what is the most reliable -- I think you described it earlier today -- most reliable way of detecting a fault?
A Most reliable is an intersection -- a cut in a borehole -- a well through the fault.
Q And in the particular geologic strata that we've been discussing in this case, if I were to find a fault even through a borehole or through drilling into the earth, would that indicate that I could find that same fault at lower strata?
A It may or it may not.
Q So even if I was to look at boring log data or boring data, I would still have to have more data in order to interpret that the fault proceeds through other layers or other strata?
A Correct.
Q I think you talked about, at least as it pertains to the major fault to the south of the well site that you've described and is described in the application, that there are Exxon -- the Exxon materials that you've looked at indicated other types

of faults. I think if you could explain that, it would be helpful.
A There were some of the interval or horizon maps that Exxon has used in the 70-some years that they've worked on this field, some of them did have interpretive faults shown in the field.
Q And you observed that in your preparation for -- preparation of the application?
A Correct.
Q And you didn't list those in the application, and what's your reasoning there?
A My interpretation, my opinion -- my professional opinion is that those faults were not -- were not present in the subsurface because the evidence that was shown on the Exxon maps indicated that there was either no throw on the fault, in which case this is not -- there is no evidence for the fault, or else the evidence -- interpretive evidence was not consistent throughout the Cockfield sands.
So, in other words, it might be present in one layer, but the next layer down was not present on an Exxon map. I interpret that or I would -- my opinion is that these were strictly interpreted by Exxon geologists and the fact that two geologists making two maps separated by only a few vertical feet,

if one doesn't see it, the other one does, probably the fault is not real.
Q Now, how is it then -- well, let me ask it a different way.
Did the Exxon maps, the ones you relied on and reviewed in preparation of the application and for your testimony, consistently indicate the major fault that is out of the well site that you've testified about and that's depicted on the diagram?
A Yes, sir. Yes, sir. They not only depicted it in -- consistently in terms of one generation of mappers, that is, the '72, the '77, '79, the '96, those generation of mapping, but there was a marked consistency from the highest Cockfield interval to the lowest.
Q There were a number of questions about the age of the Conroe field and the well bores that might be out there and the fact that many of those well bores might not have been closed properly or may not have even been completed properly -- what we consider properly by today's standard perhaps --
A Right.
Q -- no pipe or no mud or whatever.
Speculate with me, if you would -- or, actually, more than speculation. Would you give me

your opinion as to whether a wellbore into the Jackson shale, for instance, would remain open if those were the circumstances?
A If there was no casing across the Jackson, the hole would not remain open for any appreciable amount of time.
Q For geologists, "appreciable amount of time" may be different for regular people. No offense, Doctor, but what is an appreciable amount of time?
A Several years.
Q So we're not talking several thousands of years?
A No, no.
Q So if Mr. Walker's questioning about these wellbores that may have been drilled and may have been abandoned and may not have been properly maintained, if those were out there, which I don't think there's been any evidence of, but if they were out there, what would your expectation be as it pertains to the sealing feature that you've described in the Jackson shale?
A The holes through the Jackson would collapse. The shale would collapse into the hole making the hole non-transmissive in a vertical sense.
Q Now, this pertains to some degree, I think in

your answer to Mr. Walker, if he drilled holes in a piece of lead or a wafer of lead.
A Correct.
Q So lead would act differently from what you described the Jackson shale?
A Of course.
Q As part of your review, in preparation for this case, did you consider other types of waste disposal wells that are in the area of the proposed TexCom well of any type?
A Well, I certainly did consider the Class II disposal wells that are in the area, yes.
Q And there were questions about a USDW and the regulatory definition of a USDW and your interpretation of what a buffer might be above the Jackson shale. Correct?
A Correct.
Q So to orient our discussion, at least, we're talking in strata that are above the strata depicted on Applicant's Exhibit 68 about the formations above the Jackson shale?
A Correct.
Q And if you're correct about the confining nature of the Jackson shale, then the discussion is somewhat irrelevant to consideration of the TexCom

well, but with that caveat, let's talk about what other activities occur above the Jackson shale, if you've reviewed any types of records.

A There are -- at the present time, there are 54 permits for Class II injection wells, and the Class II permit -- or the Class II program under the Safe Drinking Water Act consists of those wells -- those UIC wells that dispose of oil and gas primary wastes.

This usually means produced water and flow back from well treatments, frac jobs, acid jobs, that kind of thing. So it's simply those liquid wastes that come from exploration, production of oil and gas. It's a source exemption. It's not -- it doesn't say anything about the relative toxicity or anything else about the waste. It's simply saying that these wastes are -- come from oil and gas wells, and they can be disposed into Class II disposal wells, and like I say, there are 54 permits that are issued -- that are issued to Wapiti right now in the area of the Conroe dome. The last time we talked to them, they were using 43 of them, but this was several months ago. That might have changed.

Q I'm sorry. There's a bunch of things in your answer. I want to draw out several items.

The first is, what is a frac job?

A A frac job is when the operator of a well is displeased with the way his well is operating, is producing fluid. And so he will go in there and pressure up on the formation and use some sort of chemicals to break down the formation near the borehole. This will allow then more liquids to come toward the borehole and be pumped to the surface.

Q I think you mentioned the word "acid," and I don't know if it was an "acid job" or something of that nature, but something to do with acid.

A Correct. It's the same kind of thing. This doesn't happen so much in the Gulf Coast, but with -- in harder formations where you have limestones, dolomites, things like that, you might want to use some acids in the treatment job to further break down the well or break down the formations near the well.

Q Are there other types of well reworking activities that would involve chemicals that are not needed, so to speak, not found in the oil or gas layer or otherwise found in the formation where these materials are injected through Class II wastes?

A Yes, there could be, and the treatment companies, such as Halliburton, Schlumberger, et cetera, are thinking up new sorts of treatments every day to sell to oil and gas operators.

Q So new types of treatments involving chemicals for oil and gas wells that oil and gas producers might avail themselves of in reworking a particular well?

A Correct.

Q And that those wastes then would be considered part of the exploration and production exception and be available for disposal in the 54 or 53 Wapiti wells?

A Correct.

Q As between the Wapiti wells where they are injected, do you know that depth?

A Between about 2,800 feet and the top of the Jackson, 4,088.

JUDGE EGAN: What is the depth again? I'm sorry.

A About 2,800 feet to, let's say, 4,088, and that includes the Frio sands and the Vicksburg sands.

Q (By Mr. Riley) The methodology, so to speak, between injecting into a Class II well and a Class I well, are they essentially the same in terms of equipment used and things of that nature?

A Very much.

Q Are their requirements the same --

A No.

Q -- in terms of regulatory oversight?

A No. There are much stronger requirements for the Class I.

Q And who presides, if you know, in the state of Texas over Class I wells?

A That would be the Railroad Commission.

Q When Mr. -- I think it was Mr. Walker; at least I hope I'm remembering that correctly -- asked you about a buffer zone, is the description you just gave of the activities of oil and gas production or producers some part of your reasoning?

A Yes, yes. It's exactly that reasoning, that the bottom part of the USDW at the proposed injection well is being used for disposal of Class II wastes, and it's also producing oil and gas in commercial quantities. That would make this zone a perfect buffer zone.

Q Now, explain to the Judges, if you would, why it is, if I'm understanding the testimony correctly, above the Jackson shale -- as I understand it, many of the concerns in this case involve freshwater or drinking water sources in the formations above the Jackson shale. Do you understand that?

A Correct.

Q And in what formation are those drinking

water sources found?
A They're mostly found in what's called the Gulf Coast aquifer system, the GCAS.
Q Can you recall the names of those aquifers?
A No.
Q And where are they in relationship to the Vicksburg -- is it the Vicksburg?
A The Vicksburg and the Frio. They're beneath that.
Q So the --
JUDGE WALSTON: Who is beneath who?
A Oh, the Gulf Coast aquifer system is above the Vicksburg and Frio. The Vicksburg and Frio, the disposal zones would be below that.
Q (By Mr. Riley) Is there a confining layer, as far as you know, between the Frio and, say, the -- let's go with me that the Jasper aquifer is the next uppermost.
A Yes, yes, there are confining shales separating them.
Q And would you expect that to be true of the aquifers above the Jasper?
A I would, yes.
Q Is there some basis for your opinion that you could explain to the ALJs?

A Well, they just -- the variation in salinity would certainly -- would certainly argue for a significant barrier between them, and also the fact that the Railroad Commission has permitted those injection -- those disposal wells into the bottom part of the USDW argues that there is a significant barrier.
Q If I understand your testimony correctly, above the Jackson shale, if there's some means or mechanism unknown at this time, any of the injected material that TexCom proposes found its way above the Jackson shale would first have to rise above the Vicksburg, above the Frio, with the waste disposal wells that you've described of the current operator --
A Right.
Q -- holds permits to before it would ever reach a drinking water source. Is that correct?
A Correct.
MR. RILEY: Thank you. I have no further questions.
JUDGE EGAN: That was redirect. Recross on the redirect, Mr. Hill?
MR. HILL: One second, Your Honor.
(Brief pause)
MR. HILL: No questions, Your Honor.

JUDGE EGAN: Mr. Walker?
MR. WALKER: Yes, Your Honor, I do have a question or two.

RECROSS-EXAMINATION

BY MR. WALKER:
Q Dr. Langhus, I believe that you essentially stated that different geologists can interpret fault information differently?
A Yes.
Q And it occurred to me that perhaps you were suggesting that certainly based on information that geologists or hydrogeologists might study that these interpretations could be at least somewhat subjective as to the conclusions that they might find or render.
A Depending upon the geological or hydrological evidence, yes, they can be highly subjective.
Q Very good. Would that suggest to you then that if the issue is whether or not a given area has multiple faults and whether or not those multiple faults are significant, one geologist could say "Perhaps not, and here is why," and another geologist could say, "Absolutely significant, and here is why"?
A Exactly. The telling is in the "here's why."
Q I believe, Dr. Langhus, in your testimony so far; certainly in your prefiled testimony and your

testimony here today -- correct me if I'm wrong -- I believe I noted an absence of any reference by you to the 1975 study of the Conroe field authored by R. E. Whitson, W. A. Burns, Jr., and W. J. Davies. Is that correct?
A I did look at it, yes.
Q All right. Certainly you did not include it in your prefiled testimony?
A No, I don't believe I included any information on it.
Q Would that be one of the pieces of information that you previously testified to that you claim that you looked at but simply did not list as one of the major items that you considered?
A Correct.
Q Now, if that study indicated that the Conroe field is highly faulted and if that study indicated that the field was divided into 144 fault blocks and member study units by the authors of that study, would you consider that to be, at least to some extent, a subjective analysis of the Conroe field?
A Certainly, certainly.
Q And if that study suggested or said, "There are probably three paths of communication between sands: Juxtaposition across faults, the fault planes

themselves and behind well casing caused by breakdown of primary cement," would you suggest that that kind of description or analysis was at least somewhat subjective on the part of the authors of the study?

A It would probably be subjective, but I would guess that Exxon had some definite examples of -- and I know, for instance, as far as breakdown of casing, things like that, I know that Exxon did some remediation within the field to correct those things, yes. So that they're -- that certainly is something that has occurred in the Conroe field.

Q All right. Consequently, Dr. Langhus, if we have, in this case a hydrogeological expert such as yourself who believes the evidence of faulting in the area of review has been sufficiently designated and eliminated as an area of concern, and if we have another geological/hydrogeological expert that says, based on that person's research, it's a highly faulted uncertain area, if you will -- my term -- would you agree with me if you have those competing definitions and competing assertions that we would at least have some degree of uncertainty as to the true nature of the stability of the area of review?

A I think you have to look at where I was looking at, which is the area of review, and where the

Exxon scientists were looking, which is the entire Conroe field. I think you need to look at vertically where they were looking.

They were looking at just the upper part of the Cockfield where the production is, whereas I'm looking at a different horizon, primarily the lower Cockfield, but also the totality of the Cockfield, the confining unit, the famous Jackson shale, as well as the horizons above it.

Q And is it your testimony, Dr. Langhus, that you would recommend that the safety, integrity and purity of the drinking water underneath the ground here in Montgomery County be subjected to and left to whatever the result may be of these competing hydrogeological and expert disputes?

A No. I say that I believe I have a true and reliable picture of the geology within -- the subsurface geology within the AOR, and that that does indeed show some faulting within it, specifically the fault at roughly 4,400 feet south of the borehole, and that the engineering and regulatory controls on any kind of deep injection that occurs there, that that engineering and regulatory controls keep in mind the geology as I've described it.

So, no, I don't agree willy-nilly we

start putting industrial wastes in the ground, certainly.

Q Dr. Langhus, let me ask you, with respect to the safety and integrity of the groundwater here in Montgomery County, what if you're wrong?

A What if I'm wrong? I think there are enough -- there's enough data, there's enough conservatism built into my analysis that that will be covered, that the -- that the water within the water wells in the area will be sufficiently protected.

Q And given, Dr. Langhus, the subjective nature of your research and opinion, as opposed to another hydrogeologist's subjective opinion, given that person's analysis, if you are wrong, would the placement of this well be in the best interest -- the public interest of the citizens of Montgomery County?

A I think with the engineering safeguards, that is, the safeguards on the injection rate and pressure, that, yes, it will be sufficiently protected.

Q Let me ask you one other question. If there is more faulting than what you believe exists, and if that faulting -- let me back up.

Some faults are laterally transmissive and some are not. Correct?

A Correct.

Q Some faulting would allow vertical transmissivity?

A Correct.

Q If there is more faulting present in the area of review than what you believe and if that faulting is more significant than what you believe, isn't it quite likely that could throw off the mathematical calculations with respect to the plume and dispersal rate of injected fluids?

A I don't think so. Even if I was wrong -- and that's certainly -- there's the possibility of small faults that have a very limited throw -- could be present in the area that would connect up a couple of stray sands in the lower Cockfield. That could certainly happen, but the fact that it's confined to the lower Cockfield is not going to influence the engineering or the safety margins of the project.

I don't think that there are unknown faults that are greater than 38 feet, which is the thickness of the shale separating the lower from the middle Cockfield. I don't think there are unknown faults that large, and so that if there is an unknown fault that's between well control so there would be no geological evidence for it, if that -- if there's a 15-foot fault, let's say, within the lower Cockfield,

that would not have an effect on the computer modeling or on the safety margins built into the engineering.
Q Thank you, Dr. Langhus.
MR. WALKER: Your Honor, I'll pass the witness.
JUDGE EGAN: Mr. Forsberg?
MR. FORSBERG: Yes.
RECROSS-EXAMINATION
BY MR. FORSBERG:
Q Dr. Langhus, would you agree with me that the laws and regulations regarding drinking water are in place to protect current sources of drinking water and future sources?
A Yes.
Q So it's not just how the situation looks today that's important, it's how the situation looks at any point in the future when we need water?
A I don't know what "any point in the future" might be.
Q Well, if humans are alive, we're going to need water at some point. Correct?
A Yes, yes.
Q Okay. So "future" extends many generations down the road?
A It does.

Q Is it your testimony -- and correct me if I'm right or wrong -- that there is no way at any point in the future that the water directly above the Jackson shale will ever be useful?
A Foreseeable, that's correct, because it has -- it contains Class II wastes, so high salinity waters, which is difficult to remove from potentially drinking water, and it also contains significant quantities of organic molecules, like benzene; like polycyclic hydrocarbons, like toluene, et cetera, et cetera, et cetera, that are extremely difficult and extremely expensive to get out of drinking water.
Q Difficult to remove today?
A Certainly.
Q Down the road, we don't know. If it becomes economically viable -- we need that water and a company can make money off of cleaning that water, they will likely attempt to move the market forward, wouldn't they?
A The Railroad Commission is pretty certain that they won't. That's why the Railroad Commission allows the injection of -- or the disposal of Class II wastes into the Vicksburg and Frio sands.
Q Is it your position that -- just assume that at some point that water, as it sits today, is needed

for usable drinking water above the Jackson shale. Is it your position that -- just assume that at some point that water, as it sits today, is needed for usable drinking water above the Jackson shale. Is it your position that the addition of millions of gallons of Class I non-hazardous waste doesn't affect its usability?
A I'm not sure how to answer that. It makes a water source that's extremely difficult to clean up -- makes it extremely difficult to clean up. I don't know.
Q Does it make it worse, or does it keep it the same?
A I can't answer that.
Q We don't know?
A Right. We don't know, for instance, what kind of chemicals are going in there now. Last time we talked to Wapiti, they were putting in 120,000 barrels a day into the Frio and Vicksburg. That's ten times what we're asking for. They're actually doing it; you know, not a blue sky thing that, "Gee, it would be nice if we can put away that much water into the lower Cockfield."
Q Well, if a Class I came in contact with a Class II material, could there be a reaction?

A No.
Q No chemical reaction at all?
A No.
Q Would they mix?
A Yes, yes.
Q So it would make dirty water dirtier?
A It depends. Like I say, you don't know what the oil and gas operators are putting in their water because they have a source exemption. They do not have to analyze any of that 120,000 barrels a day.
Q We don't know specifically what's going to be in the Class I wastewater that's injected in the ground, you know, permitted to TexCom?
A Correct, not yet, no.
Q So we're putting a bunch of chemicals that we don't know what they are in the ground with a bunch of chemicals that we don't know what they are into what is defined as an underground source of drinking water potentially?
A Potentially, yes.
Q Thank you.
MR. FORSBERG: Pass the witness.
JUDGE EGAN: Ms. Collins?
MS. COLLINS: Thank you.

RECROSS-EXAMINATION
BY MS. COLLINS:
Q Mr. Langhus, I think I understood your testimony during redirect with Mr. Riley to be that if one map shows -- I think you were talking about Exxon's maps -- if one map shows a fault and another doesn't, then the fault probably doesn't exist. Is that correct?
A That's one of the criteria that I would use to interpret that fault. There are other things that -- such as the amount of vertical offset, whether or not it was cut by a fault -- I'm sorry -- by a well. There are other things to look at but, yes, yes, that's certainly one of the criteria.
Q So that's a tool for interpretation?
A Yes.
Q Okay. If there is that sort of clear disagreement in past maps, is it best not to assume that one exists?
A Oh, no, I think you need to interpret it, interpret that -- why one is showing a fault and the other is not.
Q So I'm not sure I quite understand your answer. So it's not necessarily best to interpret it as being there, but it's also not necessarily good to

interpret that it's not there. Is that what you're saying?
A There's no quick and easy answer.
Q Okay.
MS. COLLINS: Pass the witness.
MR. WILLIAMS: No questions.
JUDGE EGAN: Okay.
JUDGE WALSTON: I had a clarifying question.
CLARIFYING EXAMINATION
BY JUDGE WALSTON:
Q Could you look at your testimony towards the bottom of Page 23?
A Yes.
Q Is that called the piezometric surface?
A Yes.
Q Okay. And there at the end on Page 24, you say, "Within the area of review, the piezometric surface of the fluid in the injection zone is not less than the piezometric surface of the deepest USDW."
A Correct.
Q Okay. Is that -- when you're referring to the deepest USDW, is that this zone where the Class II injection wells are injecting, or how high up does this piezometric surface go?

A Well, it depends on the horizon that's being compared to the lower Cockfield injection zone, but I would guess that it would be safe to say that the piezometric surface, or the water level within the upper -- or the lower Cockfield probably stands higher than any of the USDWs.
Q Okay. So it would reach up into even the upper-level USDWs. Am I saying that correctly?
A Yes, if there were no restrictions.
Q Okay.
A Yes.
Q Thank you.
JUDGE WALSTON: That's all I had.
JUDGE EGAN: I just had one.
CLARIFYING EXAMINATION
BY JUDGE EGAN:
Q I understand that the Railroad Commission allows Class II disposal, no matter what it is. Does that mean it also includes hazardous waste, as opposed to non-hazardous, or do we just not know?
A There is no determination. It's simply what's called a source exemption. So if this waste came out of my oil well, I can put it in that Class II disposal well without analysis.
JUDGE EGAN: Okay.

MR. RILEY: A couple questions.
JUDGE EGAN: All right.
FURTHER REDIRECT EXAMINATION
BY MR. RILEY:
Q Following up on Judge Walston's question about piezometric surface, that also indicates that there's not conductivity or transmissivity between the stratum that you're discussing. Is that correct?
A Certainly.
Q In other words, water finds its own level. We've heard that cliche.
A Right.
Q So if they were connected, you would actually see that --
A That they had the same water level, yes.
Q Does it also mean that, generally speaking, water under pressure at greater depth is under greater pressure? Is that correct?
A Yes.
Q The -- Mr. Forsberg asked you a question, and I don't remember exactly the question, but it seemed to mischaracterize your testimony regarding where TexCom proposes to inject and where the Class II wells are injected.
I mean, Mr. Forsberg asked you a

question, like, "So we're injecting Class I wastes into Class II wastes, and we're just going to see what happens," something along those lines.
A Yes.
MR. FORSBERG: Objection, Your Honor. The statement regarding me mischaracterizing the testimony, that should have been an objection when I asked the question, not --
MR. RILEY: Well, you cut the witness off.
MR. FORSBERG: He should have objected at that point.
JUDGE EGAN: Hold on. I understand what your question was, and I'm going to allow him to ask his question. This isn't a jury. We understand what's being asked. Go ahead. You can answer.
A I can answer?
JUDGE EGAN: Yes. The objection is overruled.
A The question -- perhaps I misunderstood Mr. Forsberg's question, I don't know, but certainly, the TexCom well is not injecting into the same horizon -- into the same zone that the Class II wells are injecting into. That's simply not true. They're separated by some 3,000 feet. So that -- but the fact

that I named the Vicksburg and the Frio sands as potential buffers above the TexCom project -- so that if something were to occur, and either native water was expressed out of the Cockfield into the Class II horizon or injectate somehow -- there was a -- who knows -- and so this buffer would then function, the buffer would essentially mix the two wastes, and I don't know what the result would be.
Q (By Mr. Riley) It's not your opinion, Doctor, is it, that there is a likelihood that the Class I well injectate would mix --
A No.
Q -- with anything above the Jackson formation?
A No.
Q Finally, Judge Egan asked you some questions about Class II waste disposal, and I understood you to say that the Class II waste is simply exempt from classification as either hazardous or non-hazardous. Is that correct?
A That is correct.
Q So if it were not exempt in a legal sense, it could very well be considered hazardous under various federal and state statutes. Correct?
A It could, it could; depending upon where that -- how that water was used and because, of

course, just about any kind of produced water has small amounts of oil in it, and so that's going to -- that's going to add to its toxicity, its ignitability, all of that thing.
Q Some oils -- crude oils, produced oils, have things such as benzene. Correct?
A Correct.
Q In fact, that's not necessarily a bad thing. We use benzene for many purposes. Correct?
A Not many, but --
Q Well, some.
A -- yes, there is a place for it, yes. I wouldn't drink it.
Q I understand. And my point was that it is produced and if it can be preserved, it's preserved. If not, it's injected --
A Yes.
Q -- as you described. And those are particularly difficult chemicals to remove from this water that's reinjected in Class II wells?
A Exactly.
MR. RILEY: I have nothing further.
MR. FORSBERG: A brief question, Your Honor.
JUDGE EGAN: Well, wait a minute.

Mr. Hill? Mr. Walker?
(No response)
JUDGE EGAN: All right. Then go ahead, Mr. Forsberg.
FURTHER RECROSS-EXAMINATION
BY MR. FORSBERG:
Q I just want to make clear, you haven't actually tested any materials that are being injected by Wapiti or anybody else in these Class II injection wells in Montgomery County.
A No, no.
Q So when you say they may have some chemical in them, it's not that you have any actual knowledge. It's just they may?
A Right.
Q They may not?
A That's exactly what I said, yes.
MR. FORSBERG: Okay. Thank you.
JUDGE EGAN: Mr. Williams?
MR. WILLIAMS: No.
JUDGE EGAN: Mr. Riley?
MR. RILEY: No, ma'am. Thank you.
JUDGE EGAN: Then you may be excused. Thank you very much.
Mr. Riley, are you ready to proceed?

MR. RILEY: We are. Mr. Lee will lead the examination.
JUDGE EGAN: Give me just a second.
MR. RILEY: Your Honor, I neglected, before we switched witnesses, to offer TexCom Exhibit 68 into the record as a demonstrative --
JUDGE EGAN: It had been previously admitted, and I believe you're asking that the additional markings be added to it. Any objections to that?
(No response)
JUDGE EGAN: Then the updated Exhibit No. 68 is admitted.
MR. RILEY: Thank you.
(TexCom Exhibit No. 68 admitted)
JUDGE EGAN: And let me go ahead and have the court reporter swear in the witness.
(Witness sworn)
JUDGE EGAN: Would you state your full name for the record?
WITNESS BRASSOW: Carl Luther Brassow.
JUDGE EGAN: You're going to need to speak a lot louder.
WITNESS BRASSOW: It's Carl Luther Brassow.

JUDGE EGAN: You may proceed, Mr. Lee.
CARL LUTHER BRASSOW,
having been first duly sworn, testified as follows:
DIRECT EXAMINATION
BY MR. LEE:
Q Good afternoon, Mr. Brassow.
A Hello.
Q Mr. Brassow, did you perform the engineering work for the TexCom surface facility application?
A Yes, I did.
Q Did you also prepare the technical aspects of the surface facility application that we've been talking about?
A Yes, I did.
Q And you are a professional engineer. Correct?
A Yes, I am.
Q Did you affix your professional engineer's seal to the technical report contained in the application?
A I did.
Q Did you prepare prefiled direct testimony that you intend to give today in these proceedings?
A I did.
Q Is it sitting in front of you marked as

TexCom Exhibit 59?
A Yes, it is.
Q Does it also include two associated exhibits marked as TexCom Exhibits 60 and 61?
A Correct.
Q Are there any changes you wish to make to your prefiled testimony today?
A No, sir.
Q Do you intend to adopt it as if you were reciting all the words in there today live?
A Yes, I am.
MR. LEE: Your Honors, applicant moves to admit TexCom Exhibits 59 through 61 into evidence.
JUDGE EGAN: Being that there was no previous objections, TexCom Exhibit Nos. 59, 60 and 61 are admitted.
(TexCom Exhibit Nos. 59 through 61 admitted)
MR. LEE: We'll pass the witness.
JUDGE EGAN: Are you going to be the one -- okay. Mr. Gershon, go ahead.
MR. GERSHON: Thank you, Your Honor.
CROSS-EXAMINATION
BY MR. GERSHON:
Q Mr. Brassow, good afternoon. My name is Mike

Gershon. I represent the Lone Star Groundwater Conservation District. I don't know that we've met before.
A We have not.
Q Okay. I will be asking you some questions on cross-examination that relate to your expert opinions and testimony with respect to the TexCom commercial industrial solid waste permit applications.
A Okay.
Q I'll try to be as clear as possible with my questions.
I understand that you are a licensed attorney in the state as well.
A Yes.
Q Is that correct?
A That's correct.
Q So you're probably quite familiar with cross-examination.
A Somewhat, yes.
Q If I ask any confusing questions, I'm not meaning to trip you up. Just ask me to clarify and --
A I'll do that.
JUDGE EGAN: Could you pull that mike closer to you because you're looking at the attorney, Mr. Gershon.

A It brings new meaning to "talking out of the corner of your mouth."
Q (By Mr. Gershon) So do you have an active law practice, Mr. Brassow?
A I still maintain a law practice. I don't practice law on a daily basis --
Q Okay.
A -- if that makes sense. I have a law firm. It's still active. I'm still a licensed attorney in the state of Texas, but I don't practice law on a daily basis commercially.
Q Okay. So in your testimony where you say you have over 34 years of engineering experience, does that include 34 years since you were licensed back, I think, in the '70s?
A Yes, that does.
Q Okay. Do you have an engagement agreement as an engineer to work on TexCom's behalf in support of these applications?
A Yes, I do.
Q Okay. Was it entered back in 2004 or 2005? At what point did you begin working for TexCom?
A There's essentially two engagements. Back in 2005, I didn't have a written engagement with TexCom at that time to assist them with the permitting, and I

have another engagement, obviously, to be here and represent TexCom in this proceeding. So -- and that engagement was entered into a few months ago.
Q Let me make sure I understand. Have you fulfilled the terms of your initial engagement to work on the application?
A As far as I know I have, yes.
Q Okay. And just to be clear, was that engagement with your company, Coastal Caverns?
A No, that was individually.
Q Individually, okay. So is Coastal Caverns not associated --
A Coastal Caverns has no association with this proceeding whatsoever.
Q Okay. Yet you, as an engineer work -- so let me make sure I understand. When you are acting as an engineer, do you sometimes act as an engineer in a capacity as an engineer that is an employee of Coastal Caverns?
A Let me digress a second. Yes, the answer to that is if I engage in an assignment -- and the TexCom assignment is essentially the only engineering assignment that I've engaged in independently since 2005, 2004. I did that in my individual capacity as Carl Brassow.

Coastal Caverns is the company that currently I'm the president of. It's a company that is engaged in the development of the hydrocarbon storage project, and it has no association with TexCom whatsoever.
Q Okay. Fair enough.
A Let me qualify that. At one point, Coastal Caverns and TexCom did have a minor relationship with a company that we set up and chartered in the UK, and that company is inactive at this point.
We were pursuing a disposal project over in the UK, and we terminated that pursuant, I think, in 2004. There was issues related to property at that point, and we decided just simply to terminate pursuing that project, and TexCom was a shareholder in CCUK, which is a totally independent company. TexCom has no association whatsoever with Coastal Caverns, Inc., which is a Texas corporation.
Q Okay. So there's no arrangement, other than an hourly rate structure, for you to be working in your individual capacity as an engineer for TexCom?
A That's correct.
Q Okay. If the permits were to be issued, is it your understanding that you may continue doing some work for TexCom?

A That really has never been discussed.
Q Okay. Fair enough.
JUDGE EGAN: If both of you-all could, speak up when the air conditioner comes on.
MR. GERSHON: I'm sorry. Sure, I will.
Q (By Mr. Gershon) Did you work with Allen Blanchard in preparing the application?
A Yes, I did.
Q Okay. And I'm looking -- I was looking at the signature page for the application that was submitted, and I would be pleased to give you a copy if you would like, but I've got just a simple question.
It shows that Mr. Allen Blanchard was the signatory as the environmental manager on behalf of the applicant back in 2005. Is that your understanding?
A That's correct.
Q So can you describe, really, vis-a-vis Mr. Blanchard what the scope of your work was? Well, let me withdraw the question.
Were you working under the direction of Mr. Blanchard?
A No. Mr. Blanchard is -- I would call Mr. Blanchard an environmental manager, environmental

professional, but to my knowledge, he's not a registered engineer.
Q Okay.
A So I worked with Mr. Blanchard in the preparation of the application. Mr. Blanchard actually did a lot of the drafting of the text and all that, but essentially I reviewed all the work, reviewed materials that he put together. I did really what I would call the guts of the engineering, which is the process flow diagrams, you know, the outline and calculations relating to the MCA, the control area -- okay -- plus the associated truck unloading areas and the pumping, the tanks, what I would call the hard engineering.
Q You mentioned there was data that he pulled together. What was the nature of data and information that Mr. Blanchard pulled together?
JUDGE EGAN: Mr. Gershon and Mr. Brassow, could you speak up? The court reporter is having a hard time and I'm having a hard time. So I know nobody back in the back can hear. It's not the best. We have found those don't help too much, but you have to speak up as loudly as you can.
MR. RILEY: I would suggest maybe he hold it in his hand. It's a little MC-like but --

JUDGE EGAN: That's fine. Anything that makes it easier for us to hear you.
Q (By Mr. Gershon) Okay. Where were we? We were talking about the respective roles of yourself and Mr. Blanchard. You explained your role with the application.
Could you explain the nature of the information and the work that Mr. Blanchard did on the application?
A Mr. Blanchard essentially compiled the information that -- he was the scribner, the writer, put things down, and I would review all that information. And so he would literally type it into the application, and I would just review information and develop the information so the draft then gets done. Does that make sense?
Q It does. Are you still in communication with Mr. Blanchard?
A Actually, I have not talked to Mr. Blanchard in probably over a year.
Q So I would assume that means he's not working in support of the company's application in pursuit of the permits at this point?
A I actually don't know his relationship with the company.

Q Okay. Do you know why he left the company?
A I have no idea.
Q Okay. Who else on TexCom's team has a working knowledge of the application that you worked on?
A Mr. Ross.
Q Dr. Ross?
A Yes.
Q What is your understanding of Dr. Ross' work on the application?
A Well, he familiarized himself with the information. I think he testified to that.
Q Okay. Is it fair to say that you really -- you took the lead on that application?
A On the engineering portion, yes, that's correct.
Q So let's talk about your background and your experience with these types of applications. In your prefiled testimony, you say that you have been qualified as an expert in three other SOAH hearings on "non-hazardous industrial solid waste applications such as this one," and then you refer to three. Well, you refer to two, and then the location of the third; United Resource Recovery, Secured Environment Management and one in Deer Park. Do I have that

right?
A Yes.
Q What was the name of the one in Deer Park?
A It was the Rollins Environmental Services landfill application.
Q Okay. And so I think that I understand what you mean when you're saying "similar." I mean, how is that particular application similar to the one that we have that involves an injection -- Class I injection well in this case?
A It's what I would call progressive. The Deer Park facility was a facility that was being developed as a hazardous waste landfill as well as an incineration project back in the late 1970s, right after the Resource Conservation Recovery Act was passed.
So we began to develop the kinds of permit requirements that have been developed and I think we see now in the rules before the Commission. So we were looking at waste acceptance procedures. We were looking at the requirements for, at that time, a landfill -- and it turns out that this is an aboveground landfill, so it has some special consideration.
We were looking at testing requirements

for material because it was a commercial facility so they were receiving wastestreams into the facility.

JUDGE EGAN: I'm sorry. I couldn't hear you.

A They were receiving wastestreams into the facility. So we began to develop the procedures there in that -- you know, in that particular proceeding as to how wastes would be viewed, how it would be accepted, how it would be ultimately tested. So it was related to what we're doing now.

The United Resource Recovery project was a project in Wharton County that we began in 1983, and actually, I was a founder of United Resource Recovery. That was the first and initial hazardous waste injection well into a salt dome formation for the disposal of hazardous wastes in salt caverns. So out of that particular proceeding, we specifically have new rules that are found in 331 TAC 331.

The interesting part of that one was it was a liquids disposal project as a deep well, and so the issues that we're looking at today in terms of the surface facility are almost identical. The secured environmental --

Q (By Mr. Gershon) And before we move on, you mentioned that as a result of the United Resource

Recovery case or application, if you will, we now have rules in chapter -- you cited to 331. What do you mean by that?

A Well --

Q Were rules promulgated because of issues that came out of that application that were learned about that application by the Commission?

A Yes, because the state had no specific rules dealing with salt dome injection facilities, but we had rules dealing with -- well, we had adopted the underground injection control program. We had adopted, by that time, the Solid Waste Disposal Act and the pieces of the RCRA hazardous waste program. There were air emission issues related -- actually, they're not in the United Resource Recovery project. Air emissions were not an issue there, and then we were dealing with discharges of waters from the facility, NPDES permits.

Q Sure, certainly. Now, you said that you had -- did I understand you correctly to say that you formed United Resource Recovery?

A I was one of the founders.

Q Okay. And were its applications denied?

A No, they were actually -- that was the only time that the facility was permitted, in Christmas Eve

night of 1986.

Q And that's hazardous waste --

A Yes.

Q -- hazardous waste facility was granted?

A Yes.

Q And, now, you were about to tell me about the SEM, the Secured Environment Management project --

A Yes.

Q -- your background.

A The United Resource Recovery project ultimately was denied on remand. It went up through the appeals process about three times, and ultimately the Commission denied it on the question of solidifying wastes that would go into the cavern. So the Secured Environmental Management project was a successor to the United Resource Recovery project.

There are various reasons for that, but Secured Environmental Management was formed to reapply using the Commissioners' guidance as to what were required or what they wanted to see in the new application, and that project was granted draft permits in 1997 until a legislative action prohibited hazardous waste disposal in salt dome caverns.

Q Okay. In your testimony, you say that you have reviewed at least a dozen non-hazardous

industrial waste permits. Now, what do you mean by that? You've actually been involved on the application side of it, or you've looked at --

A I've looked at the permits, yes.

Q Looked at the permits?

A Yeah.

Q How many of those were you retained to actually work on, of those dozen?

A Well, I'm including in that, you know, Class II wastes, too. I mean, well --

Q Let me make sure I understand. You referred to it as non-hazardous industrial wastes.

A Oh, I'm sorry. Then I have reviewed -- I was not retained to work on the application of the Class I non-hazardous well application. I was retained to review the terms and conditions of those. Okay?

JUDGE EGAN: Mr. Gershon, could you direct us to the page?

MR. GERSHON: Sure; Page 5, Lines 17 through 20.

JUDGE EGAN: Thank you.

MR. GERSHON: Then Mr. Brassow's answer it's -- that's right. It's on Line 20. He refers to a dozen.

Q (By Mr. Gershon) So let me make sure I

understand. So you've -- I'm sorry. You have or you haven't reviewed the actual non-hazardous industrial waste permits?

A I have reviewed the non-hazardous industrial waste permit. I was not engaged to develop the application.

Q Okay. And in what capacity were you reviewing these dozen permits? What was the reason for your review?

A Clients just wanted to know, you know, basically were the permit conditions reasonable, and, you know, really, could they operate that way.

JUDGE EGAN: You need to speak up. It might be easier, when you ask your question, if you'll turn this way because your voice keeps dropping off, and I know we can't hear.

Q (By Mr. Gershon) Okay. So were you reviewing those permits in your capacity as an attorney or an engineer?

A Mostly as an engineer. I really couldn't separate the two. There's some issues related to just the rules, but really as an engineer, were the permit conditions reasonable.

Q So the clients that you were reviewing those permits for, were you reviewing those permits for

clients that were developing or looking for your advice on industrial -- non-hazardous industrial solid waste permit applications?

A That's probably a fair description, yes, that they were looking for advice. They were -- yes, they were looking for advice.

Q Okay. And so how many of these types of applications -- and let me take it a step further. How many commercial industrial solid waste applications have you worked on?

A Non-hazardous?

Q Correct.

A I have not developed any other -- this is the first non-hazardous industrial well that I've worked on.

Q Okay.

MR. GERSHON: Just a moment.

(Brief pause)

Q (By Mr. Gershon) Let me make sure that I understand your testimony and your background with the actual regulations that you believe to apply in this case.

In your testimony, I'm looking at Page 6, Lines 6 through 16 -- really, 6 through 9 and 13 through 16. You talk about that you have an

in-depth understanding of the regulations of non-hazardous industrial waste facilities by TCEQ and an in-depth understanding of TCEQ requirements governing these types of applications, non-hazardous industrial waste applications, that you've had many conversations and meetings with TCEQ to discuss the agency's interpretation and application of those requirements. That's a statement that you made. Do I have that right?

A That's correct.

Q Do you know Mr. Graeber -- Mike Graeber with TCEQ?

A No.

Q Okay. You've testified -- actually, I think you've given us a list of the rules that you've applied in this case; Chapter 305, including -- specifically you mention in your testimony 305.50, 281.5 and 205.45. Those are the rules you listed in your testimony and the rules that you understand to apply. Is that correct?

A That's correct.

Q Mr. Brassow, you also followed TCEQ's written instructions. Correct? There were a set of instructions that were attached to prefiled testimony.

A Yes.

Q Were those instructions that you followed?

A Yes.

Q Let's talk about some of the details of the application.

Is it true that incoming wastestreams are actually treated after they're unloaded from the customers' trucks or whatever the delivery trucks are?

A Incoming waste can be treated. They're almost always processed, and I'll differentiate the two. For instance, if we receive a material that we want to change the pH, I would designate that as a treatment. If we want to remove solid materials without changing the wastes, other than removal of the solids, that would be a process.

Q Is it necessary to use freshwater for some of the treatment or processing?

A It's not necessary to use freshwater. We could use saline water, but freshwater for washing -- you know, washing off the screens or cleaning out, say, a tank truck, you know, after the waste has been removed, yeah; so from that standpoint, freshwater is a process water.

Q What is the plan for this particular site with respect to a source of water?

A I think we have a well planned.

Q Okay. Mr. Brassow, is wastewater with pH higher than nine or lower than three still considered a non-hazardous waste?
A Yes. I think the differentiation is if it's higher than 12.5 pH, it's considered a corrosive hazardous material, and if the pH is less than two, it's considered a corrosive acidic material.
Q Are you familiar with, you know, where in TexCom's application there's a description of how the wastestream will actually be piped from storage facilities to the injection well?
A One of the figures is a process flow diagram that shows the piping.
Q Okay. Well, let's talk about that. Could you describe the nature of the pipe, the composition of the pipe that's planned to be used?
A From the truck unloading to the tanks?
Q Well, no; from the storage tanks to the actual injection well.
A Yes. I mean, it's "and/or wells." There would be, you know, if multiple wells are permitted, you would actually continue the piping to all the permits. That could be a single pipe or multiple pipes, but let's assume that it's a single pipe. You know, from the actual injection tanks when the water

is ready to be injected, there is a pump at each tank. It's -- I think the tanks are actually manifold together, and you essentially open the valve, if you will. That could be a motor controlled valve. It might be a manual valve.
Q I don't mean to be rude in cutting you off. I was really interested in the composition of the pipes. What is the composition of the pipe going to be, whether it's a metal or a ductile iron?
A I think we've called for a polynitrile tank under pipe now. We could substitute that with a normal steel -- steel pipe. Steel has higher pressure ratings obviously, and we can monitor the corrosion. That's commonly done on that. So if there's any impact on the pipe itself, we would monitor -- that's one of the monitoring provisions, actually monitor any degradation of that connecting pipe.
Q Now, I couldn't find in the application -- perhaps it's there. Help me find it if it's there, but I didn't see any description of that composition of the pipe, and help me get there.
What I'm hearing you say is that it depends on the wastestreams, and I think what I'm hearing you say -- correct me if I'm wrong -- that TexCom will have an ability to substitute out the

pipe, if that's what I heard you say?
A Actually, the probable -- the final selection of the piping hasn't been made. The probable selection of that will be a steel pipe, and the reason for that is simply pressure ratings.
If you want to inject into the well at such and such pressure, the connecting pipe between the discharge size of the pump and the wellhead has to be higher than the injection pressure obviously. That, in all likelihood, will be steel. If there is another material that is -- will meet those pressure requirements, then we may substitute it out.
Q So it's not described in the application? It's --
A I thought it was on a table actually. I think there was a table about the materials of construction, and I thought there was a table that indicated the piping that goes from the injection pumps to the wellhead. So I think it's in there.
Q Does your recollection of that table include a variety of options? You mentioned --
A I can't recall.
Q Well, what would the other options be, other than steel, PVC?
A Well, you could have a reinforced

fiberglass-type pipe, is one. But, again, it all depends on the final pressures and the wellhead pressures and what the material will be. That's what I'm saying. I'm telling you that the likelihood is that that steel will -- I mean, the piping will be steel from the injection pumps to the wellheads.
Q Are you familiar with the fairly extensive table -- well, let me say with a table with a fairly extensive list of potential wastestreams?
A Yes.
Q Okay. Are you confident that the steel pipe would not be corrosive -- well, that -- are you confident that there wouldn't be any problems with a steel pipe if any of the identified wastestreams were to be brought on and pumped through that pipe?
A Absolutely confident.
Q Okay. Where -- well, can you describe for me whether -- well, how the mixing and storage tanks are cleaned? Are they cleaned from time to time?
A There's always provisions in the tanks that they can be cleaned. Whether they're cleaned or not is depending on whether you build up any sludge or residuals in the bottom of the tanks.
I don't think we've spelled out a schedule for cleaning. That would be an operational

issue about whether sludge built up in a tank and it would cause some problems.

The way that the waste is situated or designed to come in, it's essentially processed and/or treated to remove the solids. So the chances of building up any sludge in any given tank is very small, but if there was some sort of precipitation or sludge build-up and it caused an operational issue, yeah, they would be cleaned.

Q Okay. On Page 16 of your testimony, beginning on Line 1, there's a discussion of the possibility of precipitates forming downhole. What you say is that clients' wastewaters may require additional processing to avoid that, to ensure the precipitates do not form downhole.

Now, where will that processing occur to remove these precipitates?

A There's mixing and reaction tanks. There's a couple of them called out, and if during the analyses of the incoming wastestream it would appear that, you know, that the wastes could precipitate out a solid, we would anticipate that and actually treat that waste -- this may not be necessarily neutralization.

It would simply be adding a chemical such that the material would precipitate out, and then

that material -- the wastewater with the precipitate at that point would go through the filtration unit to remove the precipitate so it doesn't go downhole so the precipitate is not formed in the formation.

Q Okay. How are those solids removed from the site -- removed from TexCom's property?

A It goes into a solids bin and then it's manifested and goes to a landfill.

Q Okay. Does the application describe that process?

A Briefly. It says that the solids removed from the wastestream go into one of two solids tanks or bins, and then when -- at the appropriate time, whenever they're full or close to being full, tanks are removed and the solids are taken to a landfill.

Q Would you classify -- or do you know whether those solids would be classified as non-hazardous wastes?

A In my opinion, they would be non-hazardous solid wastes.

Q Okay. And has TexCom identified a landfill where those solids could be disposed of?

A I don't think so. I think Mr. Ross testified they haven't selected a landfill at this point, but it would be a permitted landfill; in other words, if the

Conroe landfill could receive industrial non-hazardous wastes, that would be a candidate site.

Q Okay. You mentioned in your testimony on Page 15 -- I believe you began around Line 10 -- you talk about the shaker screen. You say that if the wastestream had any odors, those might be released during treatment in the shaker screen unit. That was the exception to the possibility of there being odors.

MR. LEE: Objection; Your Honor.

JUDGE EGAN: What's the objection?

MR. LEE: I think it's a mischaracterization of testimony.

MR. GERSHON: Okay. Let me read the testimony. I'm sorry, Judge. I think you were about to comment.

JUDGE EGAN: Go ahead and read it verbatim if you would like.

Q (By Mr. Gershon) Okay. Let me -- to be fair, let me read the question and the answer. The question is, "Do you believe that waste offloading or any other activity at the surface facility will result in odors?" You answer, "In a word, no. The wastewater will be contained in airtight pipes, hoses or tanks virtually the entire time from when it arrives at the site to when it is injected into the

well. The only exception is when it is treated using the shaker screen unit, but the type of industrial wastewater TexCom will be disposing of is generally odor free." Is that your -- do you still stand behind that statement?

A I do.

Q So what I want to know is what you mean by this exception. Is it true that all of the potential wastestreams that TexCom may take are odor free?

A It doesn't mean that all of them are odor free. I just --

Q Well, you answered that question. Let me take the next step.

So if some of the wastestreams do have attributes of some odor, emit properties of -- emit odor, how might those odors be emitted under this exception where they're running through the shaker screen unit?

A I can't quantify, but I can qualify. It's very small because the shaker screen units are a relatively small open top -- it can be open topped. Actually, it can be a closed-top unit, too, and it consists of a series of different screens. The waste comes in, is piped in over the shaker screen. This is a typical oil field piece of equipment, use it all the

time, too.
The waste comes in, goes across the screens, and like I say, it can be one or multiple screens to take out or make a cut of a certain particle size. If the shaker screen is actually open to the atmosphere, that is the one point where, you know, you could have odors emitting.
If you close the shaker screen, then you reduce the possibility of any odors coming off the shaker screen. The solids come off the shaker screen into the bin. The water goes to the bottom, goes back into the pipeline onto the next tank or the next processing point in the -- in the management control area, the MCA. I'll refer to it as the MCA.
Q Let's talk about contingency plans, some of the emergency measures that are built into the application.
Let's talk about rain events and stormwater management. Can you describe what run on means, run-on water?
A Yes, runon, if you have -- if you have a severe, say, rainfall event and you're -- let's take a -- let's take your house. If you don't build your house up and then water comes against it, it can run on to the house, or, you know, flood the house, or in

the case of an industrial site, runon can come across the site. Runoff is going the other direction, off the site and into a drainage feature. So we differentiated how much can come on to an active unit versus run off, which is going away from the facility.
Q And is it true that TexCom is obligated to capture that runon and not allow it to run off the property?
A The design is such that we are capturing the rainfall on the active management units, that's correct. We're not preventing runon to the site.
Q Understood. And I didn't mean that by my question. Just the runon that is actually making it to the site is captured on the site?
A No. The runon that comes onto the site, we've designed the facility such that the tanks and the waste unloading areas are not subject to any runon. They're protected with a concrete wall. They're protected with a berm. When we actually construct, we may actually elevate the site a little bit so runon doesn't impact the active management unit.
Q Okay. So let me -- your testimony is that TexCom has undertaken contingency planning for worst-case scenario rainfall. Correct?

A Correct.
Q Okay. Let me make sure I understand. The stormwater that makes it to the site that -- well, what water is it that -- what do you do with the stormwater that makes it onto your site? How do you capture it and deal with it?
A Well, let me give you an example. Let's say that the top of the podium here is the site, and I put a teacup out there, which represents the management unit. We're capturing the water that falls into the teacup and disposing of it.
Q And where do you do dispose of it?
A In the deep well.
Q I'm sorry?
A Into the well.
Q What happens in a major rain event where that cup fills up very quickly and you don't have an ability to capture the quantity of water that --
A But we do have the ability. That's what we designed the facility to do. The active management -- the MCA is approximately 118 by 70 feet, I believe is what the dimensions are, and it is surrounded by a two foot -- it's on concrete with a two-foot perimeter concrete wall.
Q Let me ask you some questions about that.

Are you using some of your actual storage tanks to capture that water and to hold that incoming stormwater?
A No. The volume of the management unit itself is more than the 100-year, 24-hour rainfall event. So that if the 100-year, 24-hour rainfall event was 12 inches, there's two-foot high walls. So we could actually hold a 24-inch rain, if you will.
So we've overdesigned the collection ability of the entire active management area to capture all the rainfall, and we have -- you know, in the unloading area, that's captured in there also. So we have the ability to capture all the rainfall, but what we're doing is our preferred and -- our method of operation is to pump the rainfall as it occurs into the storage tanks, and then at the same time we're injecting water into the well, but literally if the pumps failed, the system was designed to capture all the water and contain all the water without any discharge.
MR. GERSHON: I pass the witness.
JUDGE EGAN: I'm just trying to figure out who's asking the questions. Okay. Ms. Stewart, you may proceed.
MS. STEWART: Thank you, Judge.

CROSS-EXAMINATION

BY MS. STEWART:

Q Mr. Brassow, my name is Julie Stewart. I represent Montgomery County and the city of Conroe. I would just like to ask you a few questions about what I'm going to be calling the surface facilities.

A Okay.

Q Based on your work and your preparation of the surface facility application, do you have an estimate of how many trucks will be accessing the proposed facility each day?

A Well, that's -- that is a function of a couple of parameters, the biggest one -- or the maximum amount would be if we -- or if TexCom -- not "we" -- if TexCom had a very good marketing program and they're receiving their daily maximum limits, then I think that number is in excess of 500,000 gallons a day. That would be extraordinary. That would be -- I think the math on that is about 90 trucks a day if you're at the permitted levels.

Q Do you know, based on your work on this project, the hours that TexCom will be actively accepting waste?

A We estimate in the range of eight to ten hours a day, I think.

Q Do you know approximately what time, starting from the morning until the evening, is eight to ten hours a day? Do you have any knowledge concerning that?

A Actually, I don't. That's an operational decision, when the doors would open.

Q So if TexCom would be actively accepting waste for treatment, storage and disposal after dark, does the surface facility application show any location of exterior lighting?

A Yes, it does.

Q Where are exterior lights to be located?

A On the corner of -- on all four corners of the management control area, around the waste unloading area, and I believe there's lighting in the office and laboratory area.

Q Do you know the maximum volume each truck will be carrying? What's the maximum volume a tanker truck could carry to the site?

A There's several types of trucks that can bring waste to the facility. All of them are what I would call tanker trucks. The largest, I think, is, like, 130 barrels. It looks like a gasoline truck, that size. Then you have vacuum trucks that are a little bit smaller, and I think those are normally

about 100 barrels or 4,200 gallons, and then you can have smaller vacuum trucks that would be in the range of 50 barrels, so that would be 2,400 gallons.

Q How many unloading bays are proposed to be located in the surface facility area?

A Four.

Q In the surface facility application, is there any information on whether or not the arrival of trucks will somehow be scheduled? Is that a reality in this industry?

A I don't believe we address scheduling, per se, in the application. The reality is it's a function of the generator and when he can load his wastes and actually discharge the truck. So it's not possible for me to predict that.

Q I appreciate that. Thank you. So operating at maximum value, in TexCom's best case, there could be 90 trucks arriving at the facility between eight and ten hours a day for four unloading bays. Is that correct?

A That's the theoretical maximum. We, right now, are looking at eight to ten hours of operation. There is a -- estimate, if you would, about three trucks per hour per day. So it could be 12 trucks per hour in terms of the operational part of receipt and

discharge.

Q I appreciate your bearing with me. I understand that this concerns the operational aspects and that you have testified in response to Mr. Gershon's questions that you took the lead on the engineering portion --

A Yes.

Q -- so I appreciate your patience.

Let's turn to your prefiled testimony on Page 32. Specifically at Line 4, you're responding to a question from your counsel, "Will it be possible for any truck driver to enter the TexCom site at times when no one is there to discharge his truck contents on his own, and why not?" And you answer, "No, the facility will be manned 24 hours per day, and all trucks entering the site must pass their security."

Who will be manning the facility 24 hours per day?

A A security force. It could be contract. It could be TexCom security people.

Q Where will the security be located on the site?

A I think it's right at the front gate. You would have to check in at that point.

Q Is this shown somewhere in the application?

A I thought it was at -- I thought it was on one of the figures, yes.

JUDGE WALSTON: You thought it was on what?

A One of the figures.

Q (By Ms. Stewart) It is your testimony that security guards will be at this site 24 hours a day, 365 days per year?

A Yes.

Q And will the entire perimeter of the property be fenced?

A I don't know if the entire property -- that's 27 acres. Okay? There will be a decision on security fencing, you know, over a portion of the site, I believe, so what I would call the active portion, you know, where trucks, people would be, yes, that would be fenced. Access would be restricted, but I can't sit here and tell you it's 27 acres. That's the entire property, is 27 acres.

Q How high will the fencing extend? What will be the height?

A Well, if it's a normal cyclone-type of fencing, it would probably be six foot.

Q In your opinion, is that sufficient to discourage entry?

A Oh, yes.

Q How many gates will be located on the property?

A I think three gates would be located on the property.

Q Will all three gates be manned by security guards or other personnel?

A The security would be there. Now, the gates themselves, at night, there may be, you know, camera security or something like that, but the site will be manned 24 hours. So there's always on-site security. There's various ways to do that.

Q Mr. Brassow, how will the trucks that will be coming to the facility to unload the waste, how will they actually access the surface facility?

A They will come into the truck gate or entrance gate. I think there's a separate personnel gate that we've set up where just people could come in, but the truck gate will come in at that point.

He would have -- there would be a check point there for the truck, you know, to show documents, manifests, whatever, and there would be a screen at that point; you know, is this guy scheduled to be here. If yes, proceed to the next point. The next point would be the unloading area and then the

process starts.

Q So you just mentioned, the question might be asked, "Is this guy scheduled to be here?" So there could be some scheduling?

A There could be scheduling, yeah. I'm just saying it's not necessary, you know, an industry standard that X, Y, Z truck shows up at A, B, C time. It's just --

Q Where is the truck gate -- what I'll call the truck gate, where is that to be located?

A Right now it's shown on the figures as right there at Creighton Road.

Q Okay. Did you conduct any sort of traffic study for Creighton Road as you prepared this surface facility application?

A I did not conduct a formal truck study, no.

Q Did you hire any consultant to do such a study?

A No.

Q Is that something that's typically done when a surface facility such as this is planned in a residential-type area?

A I don't think it's a residential-type area, but it all depends on where your -- it all depends on various factors. You know, 3083 is an FM road and

it's highly traveled.

You know, referring to a different project I worked at, we actually did a study -- actually, the state highway department did the study, and the impact of trucks comparable to TexCom was very small.

Q But you, in developing the surface facility application, all the schematics, all the plans, show Creighton Road as the entrance to this surface facility?

A At this time, yes.

Q So you're qualifying that by saying "at this time." Is that going to change?

A Well, I don't know. I mean, there was testimony the other day about the possibility of bringing the access road off of 3083, and if the access road is developed off of 3083, then there would be a slight change there. That would become the truck entrance off of FM 3038, but I don't think any decision has been made as to that point.

Q But the surface facility application materials right now all contain information concerning Creighton Road. Correct?

A That's correct.

Q Are you -- excuse me. Did you do any

research to determine if there was weight rating for Creighton Road, a truck weight rating?
A I did not.
Q Would that be something that would be typically performed, that type of research, when a surface facility application is being prepared?
A Well, you would certainly look at it.
Q Do you know the width of Creighton Road?
A If it's a standard road -- from my observation, it appeared to be about 22-, 24-foot wide, two lanes.
Q Does the area of Creighton Road that provides access to this facility, does it have paved shoulders?
A No.
Q Would you generally describe the type of development that exists along the portion of the road where the surface facility is planned?
A Well, when you turn on Moorehead Road and are about to turn onto Creighton Road, there's a Valero gas station, so that's certainly commercial. I think there's a commercial facility behind this gas station, and I think there is a building across from the current gate that's on Creighton Road. I don't know that it's a residence or not.
Q Okay. Let's turn to Page 12 of your prefiled

testimony, starting with Line 16. You were asked, "Where in the surface facility application a map is located showing the location of the surface facility on the TexCom property," and you reference Attachment 22. Is that correct?
A Yes.
MS. STEWART: May I approach the witness?
JUDGE EGAN: Yes, you may.
MS. GOSS: Do you know what volume that is in?
JUDGE EGAN: I'm sorry.
MS. GOSS: I asked Ms. Stewart if she knew what volume that was in.
MS. STEWART: Volume 11, TexCom Exhibit 39, Page 97 is Attachment 22, which I will also pass out to everyone.
(AP Exhibit No. 10 marked)
MS. STEWART: I would like to offer AP Exhibit 10 into the record as a copy of the Attachment 22, which is attached to TexCom's surface facility application.
JUDGE EGAN: Any objection?
(No response)
JUDGE EGAN: Then AP Exhibit No. 10 is

admitted.
(AP Exhibit No. 10 admitted)
Q (By Ms. Stewart) Mr. Brassow, based on Attachment 22, could you please walk the Court through the general procedure a truck will follow once it enters the facility off Creighton Road, starting with the waste vehicle access gates?
A Yes.
Q I know this is small. I hope everyone can see it.
A Ready?
Q Yes. Thank you.
A Start with our little sunshine north arrow up in the upper right-hand corner, there's a -- it says "Survtech," and there's a -- looks like a plum bob. That is essentially Creighton Road.
So currently the trucks would come down Creighton Road to that first corner and would turn right if you're looking from the top of the facility. If you're looking at it, turn left into the facility, through the gate and that would be the truck access point.
On your right, you see a small depression area that's shaded. That's a small, little pond, and you'll see essentially a crude

horseshoe-shaped access road that's there now.
The truck would follow that access road around and come down to the rectangular cross-hatched area, which is the -- that's the MCA and the truck unloading area. Next to the roadway you see that is the side where the truck unloading area is and in back of it is the MCA.
Trucks would back into that point, discharge the wastes, and then come back on the road and leave the site going to the right and would pass the three small buildings at that point back onto Creighton Road, then take a left on Creighton Road back up to 3083.
Q You've just testified that the access road is constructed. Correct?
A There's a piece of road there now. It will probably be improved.
Q And you mentioned that at the -- you're calling it the MCA, the main containment area; the trucks will turn around and back into the area?
A Yes, the truck unloading area is on the front side of that MCA, so they would turn out and back in, yes.
Q At what point upon arrival will samples be taken from these trucks?

A When they back into the unloading station.
Q How will these samples be delivered to the laboratory?
A Personnel will pick it up, put it in a sample container, take it to the laboratory.
Q Have you identified which personnel will do this?
A It would be the lab chemist, I'm sure, or one of his technicians.
Q What distance will that be -- how many feet will the main containment area be located from the laboratory?
A It looks to be about 200 feet, maybe 250 feet.
Q They would be actually carrying --
A Yes.
Q -- the sample from the truck to the laboratory?
A Yes.
Q Looking -- let me direct your attention to another portion of Attachment 22, and this is the area where FM 3083 is shown. How wide is the entrance from the TexCom property from 3083?
A From the scale in the upper sunshine north arrow, it looks like the frontage -- well, it says

72.92 feet so --
Q How far would the trucks travel before they would make a very sharp turn to the left based on this drawing?
A At least 111.12 feet.
Q Then would you consider that to be basically a 90-degree turn? How would you characterize that turn that they would have to take based on the contours of the TexCom property?
A I don't consider that to be a problem. In other words, the distance is longer than the length of the truck, and you can just make that turn. You can make the curve as sharp or as shallow as you want at that point.
Q Then, again, once the trucks enter off 3083, if that indeed is to be the change that's been discussed in Dr. Ross' testimony yesterday, how far a distance would the trucks have to travel to reach the current location of the surface facility location as is shown on Attachment 22?
A It would appear to be about 1,100 feet.
Q So if the schematic of this surface facility is kept the same as what's shown on Attachment 22, trucks entering the facility off 3083 would have to travel about 1,100 feet to reach the office,

laboratory, and they would be required to turn around somewhere on the facility. Is that correct?
A Well, let's assume hypothetically that the truck is just following that one line that says -- you know, it's a survey call point. So I think it's the property -- it's actually one of the eastern property lines of the TexCom tract. Where the 1,105.65-foot dimension is, if the truck just followed that fence line, it will come to the MCA area and nothing else would change. It would simply still turn out and back in.
All it is -- the point of entry to the truck unloading area would change, but the truck unloading area and everything associated with the surface facilities doesn't change at all, just the roadway.
Q But by that schematic then, the truck completely bypasses the office. Is that correct?
A It doesn't have to. I mean, when the truck leaves or -- I'm not sure I follow your point. It doesn't have to. I mean, we're talking about the routing of a truck on a piece of property owned by TexCom. So if the office or the laboratory or something like that becomes more convenient to change its location, that can be done without even changing

the location of the surface facilities at all. The only reason it's shown right now next to Creighton Road is because under this application, that is the entrance and exit point for the trucks onto the site. If that entrance point changed, the office location can change, if necessary.
Q Does the surface facility application address containment of a spill that could occur after a truck enters the facility property but before it reaches the offloading area?
A I don't think it addresses that because that's not a high probability.
Q Would that probability increase the more a truck would have to actually travel within the TexCom property to reach the offloading area?
A No.
Q You had testified earlier about a process flow diagram. Do you recall where that's located in the application?
A They're in the Exhibits 21, 22, that set and following. There's a series of process flow diagrams in there.
Q Do you know if that -- what you're referring to shows the location of the injection wells in relation to the surface facility, specifically the

distance that the injection wells are located from the surface facility?
A Actually, the exhibit that you just showed me, or you just gave me, shows that well in relationship to the surface facilities, and it appears to be about 300 feet.
Q You had discussed the composition of the pipes that will carry the waste from the surface facility to the injection wells with Mr. Gershon. Correct?
A Yes.
Q You testified that will probably be sealed?
A Yes.
Q Do you know which of the injected chemicals that are proposed to be disposed in the waste wells, do you know which potentially corrode steel, if any?
A Actually, I don't think any of them will really corrode steel. Now, let me qualify that statement.
We're accepting wastes that can have or may have, you know, pH levels at about three. You would call that an acidic waste, but it's not a terribly aggressive acid waste. The corrosion of any steel pipe, depending on its alloy, is really a function of how long the contact of that material is

within the pipe.
So if you accepted something, say, as low as three -- and that's one of the criteria for the injectate, the time it takes to leave the pump to a wellhead is very short. It's a matter of probably less than a minute or so.
Q Along those same lines, is there any sort of containment measures that are shown in the application to -- if a spill should occur from the pipes that are carrying the wastewater from the surface facility to the injection wells?
A Not a containment measure. It's covered under the inspection. There's an aggressive inspection program in which those pipes are inspected, I think, on a daily basis. So if there's any indication of corrosion or deterioration, then steps are taken accordingly.
Q Are those pipes to be located aboveground?
A They can be located aboveground. There's -- again, there's two ways of looking at that. If the pipes are buried, they're actually protected. Believe it or not, pipes become targets for some people. They like to shoot them, and so if they're belowground, you protect the pipes from vandalism and possible, you know, destruction.

And if they're aboveground, they're much more easily inspected. And so the final decision hasn't been made, and if so, whether they will be on pipe racks or sleepers.
Q When will that decision be made?
A Before construction.
Q Let's go back just a little bit. We were just talking about corrosive effects of the injected wastewater.
On Page 27 of your prefiled testimony, Lines 11 through 12 -- actually, I think that's the wrong reference.
You testified in your prefiled testimony -- and I typed in the wrong reference -- that the wastewater -- non-hazardous wastewater such as that TexCom proposes to handle is generally innocuous.
A That's correct.
Q This reference is correct. On Page 19 of your prefiled testimony, Lines 16 through 18, you reference an EPA database that has been created to determine the composition of what you characterize as the most generally injected waste fluids at Class I wells. Is that correct?
A Which lines are you referring to?

Q You begin at Line 16, after the period, "Additionally, EPA has recently created a database for determining the composition of the most generally injected waste fluids at Class I wells," and you give a reference in the application.
A Okay.
Q Page 19.
A Yes, I see that.
MS. STEWART: If I may approach, I would like to offer this table that's referenced as an exhibit, AP Exhibit 11.
(AP Exhibit No. 11 marked)
Q (By Ms. Stewart) Mr. Brassow, did you prepare this table based on the EPA information, or is this a copy of the EPA table?
A I think that it may be a copy. I'm not sure. I think the actual preparation of the table Mr. Blanchard did.
Q Does the EPA's characterization of some of these referenced chemicals which could be contained in Class I wastestreams, does the characterization of those as "strong oxidizers, enhance chemical corrosion," seem innocuous to you?
A These don't seem innocuous.
Q So the characterization that sodium chloride

enhances electrochemical corrosion --
A Sodium chloride is salt. It's brine.
Q "Sulfates can react to form minor amounts of acid, nutrient for bacterial growth," does that sound innocuous?
A Repeat that, please. Sodium sulfate?
Q Sulfates. I'm reading under "dissolved species," under the fourth category, "Sulfates can react" --
A Yes.
Q Does that seem innocuous?
A Yes, it does.
Q Finally, on Page 17 of your prefiled testimony, Lines 8 through 9, you state that the surface facility TexCom proposes to operate will be regulated primarily under the Health & Safety Code, Chapter 361, and Chapter 335 of TCEQ's rules. Is that correct?
A I think that's -- that's what I said, yes.
Q And then you state that, "The vast majority of the regulations in 335 apply only to facilities that handle hazardous wastes." Is that correct?
A That's what I said, yes.
Q Mr. Brassow, do you know whether Administrative Code 335.4, Section 2, applies to

TexCom's proposed facility?
A 335 point --
Q Four, Section 2. I can read you the --
A Yeah, that would help.
Q It's titled "General Prohibitions." Let me know if you can't hear me, if my voice starts to drop. It states that, "In addition to the requirements of Section 335.2 of this title, relating to permit required, no person may cause, suffer, allow or permit the collection, handling, storage, processing or disposal of industrial solid waste or municipal hazardous waste in such a manner so as to cause," Subsection (2), "the creation and maintenance of a nuisance."
A Okay.
Q So does that apply to TexCom's proposed surface facility?
A I suspect it does, yes.
Q And are you familiar with a nuisance -- with what a nuisance would be?
A I think nuisance is in the eye of the beholder.
Q Okay. Could you be more specific?
JUDGE EGAN: Are you asking in his position as a lawyer what a nuisance is or what the

general terms means?
Q (By Ms. Stewart) I believe I would like you to answer in your position as a lawyer, which might be --
A Well, let me answer it in terms of, you know, what I would call the general term. To me, a nuisance is something that is obnoxious. In other words, if you -- if there was a dead dog on the side of the road and you were right there, that could become a very obnoxious thing. That's a nuisance to have it there.
Just because you don't like a particular element or don't like a particular event or something like that, that in and of itself doesn't create a nuisance. I'm not sure that there is a very definitive term for "nuisance," and I don't think I can elaborate any more than that.
Q I appreciate your -- I appreciate your candor with me concerning that. I know that Mr. Gershon touched a little bit on odor and your prefiled testimony concerning the odor that might be generated by the shaker screen unit, and in your prefiled testimony, you mentioned that you had visited 20 surface facility -- surface facilities while they were operating. Is that correct?
A That's correct.

Q While you were visiting those 20 facilities during the operations, did you notice any odor personally?
A Not particularly. All facilities are different. Odors are derived from different material. If you're in a plant that produces a very odorous material, you will obviously smell it and probably smell it every time that you go to that particular plant site, but if you're in an area -- and I'll use the TexCom facility as an example -- receiving different wastestreams from different facilities and they have, you know, either zero odor or very low odors --
JUDGE EGAN: Could you speak up just a little?
A They had very little or no odors, is that to say that there may not be a load at some point that comes in that has more odor than the other? Probably. But that doesn't, in my mind, going to your nuisance questions, create a nuisance.
And the mere fact that there is an odor doesn't create a nuisance. Let me give you an absurd example that some people might consider perfume to be offensive. Well, people pay lots of money for perfumes. Perfumes are, by nature, odorous, but

they're nice odors.
MS. STEWART: Thank you. I have no further questions.
MR. WALKER: I'm sorry, Your Honor.
JUDGE EGAN: It looks like you may have one or two more questions.
MS. STEWART: I may have one or two more questions.
MR. WALKER: Could we have maybe 30 seconds?
JUDGE EGAN: Yes.
(Brief pause)
MS. STEWART: I withdraw my statement that I have no further questions.
Q (By Ms. Stewart) I would like to ask you a few more questions, please, just a few. I realize it's almost 5 after 3. I apologize.
If you could, turn to Page 30 of your prefiled testimony, starting at Line 16 where you're asked a question by your counsel.
A Yes.
Q If I may summarize that instead of reading it in an effort to save a little bit of time, is it correct for me to say that you state, "It will not be possible for TexCom to accept toxic chemicals or

hazardous materials"?
A The definition of "hazardous" and "toxic," that's correct. They won't accept hazardous or toxic materials.
Q You said, "by the definition of toxic or hazardous"?
A Yes. There's a definition in the rules for hazardous and toxic materials. TexCom will not accept hazardous or toxic materials.
Q Would you consider mercury to be toxic?
A I think there are forms of mercury that are toxic. I don't know that anybody exposed to elemental mercury -- I think, yes, that could be toxic, elemental.
Q Would you consider cyanide to be toxic?
A Depends on concentrations. Different materials have different concentrations at which they would become toxic.
Q Would you consider benzene to be toxic?
A At certain concentrations, it would be.
Q Referring to the actual application, is the method of analysis of the proposed wastestream set forth in the waste acceptance program?
A Would you repeat that, please?
Q Is the method of analysis of a proposed

wastestream set forth in the waste acceptance program?
A That's not spelled out in specificity in the application. In the draft permit, they were required to follow either EPA's SW-846 or TCEQ's CWAP program protocol. So there is a very specific protocol for testing, and TexCom would have to follow that.
Q And you said it was EPA --
A SW-846, I think, is the methodology.
Q And that's contained in the draft permit?
A I believe it is, yes.
MS. STEWART: I have no further questions.
JUDGE EGAN: All right.
MS. STEWART: Thank you.
JUDGE EGAN: Mr. Forsberg?
MR. FORSBERG: Yes, Your Honor.
JUDGE EGAN: Go ahead.
CROSS-EXAMINATION
BY MR. FORSBERG:
Q Good afternoon, Mr. Brassow. I guess you're a doctor, but they don't call us doctors. Right?
A Correct.
Q You have a doctorate?
A Correct.
Q One thing I would like to understand is when

you designed the flow chart of how material flows through facility -- you designed that or drew it?
A Yes.
Q There is a place for filtered solids to go, like a storage tank. Correct?
A There are two bins there, yes; roll-off bins or something equivalent to that, yes.
Q And then there is obviously the injection wells, 1, 2, 3, 4?
A Injection wells?
Q Yes, the proposed injection wells.
A Yes.
Q There's also a waste oil tank?
A Yes.
Q And that is -- how is the waste oil taken off site?
A Well, that would be pulled off and put in a vacuum truck.
Q Okay. So just so I'm clear, you take one wastestream and turn it into three?
A I'm not sure I follow your question.
Q Well, you have one wastestream coming in from tanker trucks that you pump into your facility, and then some of it goes to solid -- goes into a solid waste disposal, which is trucked off somewhere else.

Some of it goes into oil waste, trucked off somewhere else, and then some of it is injected into the ground.
A Well, actually, the oil is recycled.
Q Okay. But it's not on site?
A No.
Q Okay. So it's still waste.
A No, not if you recycle it.
Q So your reference to waste oil on your own map is incorrect?
A No, it's not incorrect. If you separate the oils from the waters and collect them, you know, you can recycle those oils, take them to waste oil recycling.
Quite frankly, I think the Class II wells that have been indicated here before, that's pretty much standard operation to skim the crude oil off the waste and recycle it also.
Q Are there alternatives where you could get rid of all this waste at once?
A Yes.
Q What kind of storage tanks are on the facility?
A I'm not sure I understand your question.
Q Let me rephrase it. Are there atmospheric storage tanks on the facility?

A There are fixed-roofed vented to the atmosphere, yes.
Q So every single one of these storage tanks has a vent on them?
A Yes.
Q Is it your testimony that no odor can escape from any of these vents?
A That's not my testimony.
Q Well, I thought I heard that the only exception to odor was the solid waste vent.
A Well, you can actually have the vent that can have a pressure release value on it. So it doesn't have to be an atmospheric vent. You can set a half pound pressure release valve or something like that. So if pressure inside the tank builds up, it would relieve pressure. Otherwise it's there, and nothing is released.
Q So you're saying with a pressure valve, there's absolutely no odor release?
A I'm not an insurance agent. I can't tell you -- guarantee that there's nothing -- no odor is going to be released. If there's no pressure and no release to the atmosphere, then, yes, I would say there's no odor.
Q So, in fact, there's not one exception.

There is one, two, three -- seven, eight, nine, ten, 11, 12, 13 -- 14 exceptions to the odor issue because that's the number of tanks on your diagram. Is that correct?
A There's that many tanks, yes.
Q You state that -- on your diagram of how trucks enter the facility -- Ms. Stewart was referring to it earlier. I don't have the exhibit number.
JUDGE EGAN: AP Exhibit 10.
Q (By Mr. Forsberg) You have trucks coming into the facility off of Creighton Road?
A Yes.
Q Is Creighton Road a residential road?
A Creighton Road has residences on it.
Q Would you consider it residential?
A No.
Q Why not?
A Because it has other truck traffic on it also.
Q How many trucks have you observed on Creighton Road?
A I haven't gone out there to count them.
Q Then how do you know there's truck traffic on Creighton Road?
A I guess it's an assumption that since the

road is there and it connects 45 over to 3086 that trucks would use it.
Q Okay. So you would assume the trucks would use 3083?
A No. I would assume that trucks would use 3083 as one of the main thoroughfares, yeah.
Q And that they would use Creighton Road?
A No.
Q The trucks will not use Creighton Road?
A Which trucks are we referring to?
Q The ones coming to the facility.
A I would assume they would not use Creighton Road.
Q I thought on your map that's where they entered the facility.
A Off of 3083.
Q On AP Exhibit 10, you're stating that the facility's entrance is off 3083?
A No, you didn't -- I guess perhaps I should restate what I said before.
Q Okay.
A I said trucks would turn off of 3083 onto West Moorehead Road, which terminates at Creighton Road. You turn onto Creighton Road, and within a matter of a few tens of feet you enter the facility

where the gate is. So the gate is located and fronts on Creighton Road, but trucks would come off of 3083.
Q Would the trucks ever come into contact with Creighton Road?
A Yes, the way it's stated right now.
Q Assume with me that the facility opens at 9 a.m. -- just assume.
A Okay.
Q Five trucks show up at eight o'clock. Where are they going to go?
A Probably on the shoulder of 3083 or some other facilities.
Q Is that safe?
A Trucks are parking there -- parking along 3083 now. I can't tell you where they're parking right now. If that was the case, then we would open up the facility to accommodate the trucks.
Q Well, what is your capacity in regards to how the facility is going to operate?
A What is my capacity?
Q Yes. Isn't that an operational issue?
A Yes.
Q Didn't you say earlier that you're not involved in the operational issues of the facility?
A Not at this time. There's never been any

discussion on the operational issues.
Q So you can't say the facility will open up early to accommodate the trucks?
A I can't say that they will. You asked me what I thought.
Q You estimated, I think, that at a maximum, the number of 90 trucks would come into the facility per day. Is that correct?
A At the maximum theoretical capacity at the facility, yes.
Q What size trucks are you talking about when you use the number 90?
A I was just using about a 5,000-gallon truck.
Q Is that a small truck or a large truck?
A That's a large truck.
Q So there actually could be, you know, 200 smaller trucks, in theory?
A In theory.
Q And there's only four bays, whether the truck is small or large?
A At this time, yes.
Q Are you planning for additional truck bays?
A No.
Q You said, in your experience, people like to shoot pipes?

A Actually, I have some pipes and signs, and it's a consideration in certain areas.
Q Is it a consideration in this area --
A I don't know.
Q -- where the TexCom facility is located?
A I'm not being flippant, Mr. Forsberg.
JUDGE EGAN: I can't hear.
A I said I'm not being flippant. I just said in my experience, you know, especially in the Beaumont area, that is a concern, that people actually go out and shoot aboveground pipes. So it's a factor to take into consideration.
Am I saying that people in this area are going to shoot pipes? No, I'm not saying that.
Q (By Mr. Forsberg) And I'm not making that representation. I'm really not. I was asking as a serious question whether that is a concern. And what could you do to prevent pipes from being shot at?
A Bury them.
Q How do you daily inspect buried pipes?
A Well, you don't look at the pipe when it's buried. You have other ways of inspecting or looking at the pipe. You can pig the pipe occasionally.
JUDGE EGAN: You can what?
A Pig it. It's a tool that you run through the

pipe, and it calculates the thickness of the pipe wall, and they have very sophisticated tools now so you can determine whether there's corrosion, degradation, deterioration of the pipe.
JUDGE EGAN: It's called "pigging"?
A Pigging, P-I-G.
JUDGE EGAN: That's what I thought you said.
A That's what it is. It's an old term.
JUDGE EGAN: Okay.
Q (By Mr. Forsberg) Is that a time-consuming process?
A Depending on the length of the pipeline.
Q Would it be an expensive and time-consuming process based upon the flow chart you've demonstrated here?
A Time-wise it would not. It depends on the type of pigging that you would use. It can become very expensive on big pipelines. The tools are very sophisticated.
Q Is there any plan for that equipment to be located on site?
A No.
Q You would actually have to hire a third-party company to do that?

A Yes.
Q Is that something that would be economically feasible to do on a daily basis?
A Not on a daily basis, but I didn't say we were going to bury the pipelines either.
Q Okay. But assuming that the decision was made to bury the pipelines, then it would not be daily -- it wouldn't be economically feasible to inspect the pipes daily?
A I would not pig the pipe on a daily basis. I would inspect the exposed portions of the pipe on a daily basis.
Q But not the underground?
A Not the underground.
Q How often would you inspect the underground portions?
A Actually, industry standards call for once every five years or so. We would do it more frequently than that, but there's protective -- cathodic protection that you would use on the underground pipe, and there's standard pipeline design factors that you use.
Q What is underneath the pipe if it's on a pipe rack?
A It would be a steel rack, that's -- if you

put it on pipe rack, it would be a steel rack. If you put it on sleepers, which are just low platforms, they would probably be concrete or concrete with a steel cradle.
Q If it was just a pipe rack, what would stop a pipe burst or pipe break from exposing the ground to the chemicals?
A If you had a burst of the pipe, it would go on the ground.
JUDGE EGAN: Could you speak up, please?
A I said if there was a burst of the pipe, it would go on the ground.
MR. LEE: Your Honors, could we ask for a break now? I think we've been going quite awhile, and I think a break is in order.
JUDGE EGAN: How much longer do you have, Mr. Forsberg?
MR. FORSBERG: I would prefer to go another ten minutes or so, Your Honor, and then I should be wrapping up.
JUDGE EGAN: All right. Why don't we wait until he finishes, and then we'll take a break.
Q (By Mr. Forsberg) Do truckers sometimes sleep in their trucks? Do you know?
A I don't know.

Q Just in your personal experience, have you ever heard of that happening?
A I've heard of it happening.
Q If a trucker rolls up to a facility at 2 in the morning and they don't want to pay for a hotel, they have the option of, I guess, just pulling alongside the road and waiting there?
A I have no idea what they would do at that point.
Q Because you haven't planned for what those trucks are going to do. Is that correct?
A That's not a fair statement. Planning is what happens when the truck is received at the facility. We have plans for what the truck does when he is accepted at the facility.
Q Okay. So you have no concern, care in the world, about what the trucks do before or after they get to your facility?
A I'm not saying that. I'm just saying we have a plan for what they do outside the facility boundaries.
Q So if they decide to pull up outside the facility and sleep overnight, it's not your problem. Is that right?
A It's not my responsibility.

Q Nor is it TexCom's.
JUDGE EGAN: Is that a question?
MR. FORSBERG: Yes.
Q (By Mr. Forsberg) When you say it's not your responsibility, are you saying it's not TexCom's responsibility?
A I don't think they have the responsibility of controlling what trucks do at two o'clock at night.
Q So you have between 90 maximum -- clarify that. You said a maximum of 90 big trucks, 200 little trucks. What kind of engines are they running?
A I don't know.
Q Aren't most trucks that size diesel powered?
A Probably.
Q Do they emit an odor?
A Probably.
Q So if you have a line of trucks coming through the facility, you have four trucks stopped at a bay, they're idling, is there going to be a consistent odor that's going to emit from those diesel engines?
A I can't answer that question.
Q Because you haven't considered the possibility of the odor from the diesel engines. Is that correct?

A That's correct.
Q In your capacity as an attorney, is nuisance defined anywhere in the law in Texas?
MR. LEE: Objection, Your Honor. I think this has already been asked and answered.
MR. FORSBERG: No. I think he responded by saying -- giving a general response. He didn't actually answer the question as an attorney.
JUDGE EGAN: Overruled.
A I can't cite you where it may be defined.
Q (By Mr. Forsberg) Do you have any knowledge that persistent odors from engines have ever been found by a Texas court to constitute a nuisance?
A I don't know.
Q Can chemicals from multiple trucks be diverted at the same time through the filtering process for solid material; meaning you have two trucks, one in Dock 1, one in Dock 2. They're both unloading at the same time. Could they both at the same time be commingled into a filter?
A They can be if they're compatible.
Q How do you know that they're compatible?
A As part of the waste acceptance program.
Q Which would require testing them prior to them being commingled?

A Yes.
Q So you're saying that there would be no chemical commingling from the trucks prior to them being testing?
A That's part of the testing protocol.
Q So, yes, there would be no commingling of materials prior to them being tested?
A That's correct.
Q Just so I'm clear, trucks will be using, as it's currently planned, some portion of Creighton Road?
A As it's currently planned, yes.
Q I would like to read you a brief statement from Dr. Ross' testimony.
A Okay.
Q On Page 27, Line 18, of Dr. Ross' testimony, "Trucks that do visit our site are expected to use FM 3083, not Creighton Road or any other residential street." Do you disagree with that statement?
A No.
Q So now you're saying that trucks will use or will not use Creighton Road at all?
A I prefaced this before in my testimony that, you know, if the roadway off of 3083 is developed, then they wouldn't use Creighton Road. As you were

looking at the exhibit, the way it's stated on the exhibit, trucks come in off of Creighton Road at this point.
Q Well, this exhibit, in all fairness, is what was submitted as part of the application. Correct?
A That's correct.
Q Has there been an exhibit submitted as part of the application showing the entrance directly off of 3083?
A Not to my knowledge.
Q Do trucks make noise?
A Some.
Q An eighteen-wheeler -- if you stand up next to 18-wheelers, there's a pretty good amount of noise, isn't there?
A Yes.
Q And if you have a maximum of 90 to 200 trucks a day, you're going to have a pretty persistent sound of commercial vehicles in the area. Correct?
A Yes.
Q And the closer you are to residential -- the closer you are to the actual trucks, the louder the noise is going to be?
A If you stack up all of those assumptions together, yes.

Q And those are assumptions that you didn't consider when you were planning the facility?
A Those are assumptions that you put together.
Q That you didn't consider when you were planning the facility.
JUDGE EGAN: Hold on. Just answer his question. Did you or did you not consider the assumptions he's postulating?
A I did not consider that possibility.
JUDGE EGAN: Anything further, Mr. Forsberg?
MR. FORSBERG: Just a couple of brief questions, and I'll be finishing up, Your Honor.
Q (By Mr. Forsberg) As trucks are being unloaded, is there any vapor that's displaced in any tanks?
A Vapor being displaced from the tanks. It would go back, again, to the final design of any venting on the tanks. If you had a pressure relief valve, then you could put fluids into the tank. Any air in the tank would be slightly compressed, and nothing would be released. So it wouldn't be displaced under those circumstances.
Q You're saying a tank doesn't have to have a vent. Is that what you're saying?

A No. I'm just saying the vent can have a pressure relief valve.
JUDGE EGAN: He testified to that previously.
MR. FORSBERG: Okay. I'm sorry. Thank you, Your Honor. I'll pass the witness.
JUDGE EGAN: All right. We'll take a ten-minute break and reconvene at, I guess, 20 till.
(Recess: 3:29 p.m. to 3:43 p.m.)
JUDGE EGAN: All right. We're back on the record.
Ms. Collins, are you ready to proceed?
MS. COLLINS: I am. I have no questions.
JUDGE EGAN: You have no --
MS. COLLINS: I have no questions.
JUDGE EGAN: Okay. And are you ready to proceed for the ED?
MS. GOSS: Yes. The Executive Director has no questions.
JUDGE EGAN: Okay. Any further questions?
MR. LEE: I do have just a couple of questions.
JUDGE EGAN: All right.

REDIRECT EXAMINATION
BY MR. LEE:
Q Mr. Brassow, were you here yesterday in the courtroom?
A I came into the courtroom rather late, but, yes.
Q You were here when Dr. Ross was testifying yesterday?
A Yes.
Q Do you recall there were -- there was a question raised, and there was actually an exhibit offered by the groundwater district that involved a sanction taken by the engineering licensing board?
MR. GERSHON: Objection, Your Honors. Is this appropriate redirect? I mean, this wasn't raised during the cross-examination.
JUDGE EGAN: This wasn't brought up -- right.
MR. LEE: I understand, Your Honors. If I could just have a minute to explain, I do think it's unfair that Mr. Brassow was -- basically suffered a character attack or attack on his qualifications yesterday through another witness, and he hasn't had a chance to explain, and I would like to give him a chance to respond.

MR. GERSHON: May I respond to that, Your Honor?
JUDGE EGAN: Yes.
MR. GERSHON: Unless you're -- well, my response is that evidence relates to impeachment of Dr. Ross' testimony. It has nothing to do with the cross-examination that occurred today. So, therefore, redirect is inappropriate under the rules of evidence.
JUDGE EGAN: Your objection is sustained.
MR. LEE: Okay.
JUDGE EGAN: You need to move on to the next subject.
MR. LEE: Okay. Your Honor, I do have a question, just to clarify the objection and your ruling. We really would like to address this issue, and we intend to do so on rebuttal if we're not allowed to do so now. Will it be acceptable to do it on rebuttal?
JUDGE EGAN: Depending on whether or not this relates to any evidence, other than the questions to Dr. Ross, but I assume so.
MR. LEE: So if things stay the way they are now, presumably we would be allowed to --
JUDGE EGAN: Well, at this point, I

don't believe -- on rebuttal, we'll take it up at that time, but at this point, I assume so, but let's deal with the issue at the time and give the parties an opportunity to object.
MR. RILEY: May I be heard on this? I'm sorry. It's a bit out of order, I know, and Mr. Lee is presenting the witness, but the issue is a courtesy issue, because at this point we did not anticipate calling Mr. Brassow on rebuttal in Austin, which is our expectation. He is in Houston, and we had talked about the courtesy of taking witnesses out of order on other circumstances. So rather than having Mr. Brassow come to Austin on the rebuttal case to answer probably five or ten minutes' worth of questioning on this subject matter, can we take that evidence now?
MR. GERSHON: May I respond to that, Your Honors? Dr. Ross would be the appropriate rebuttal witness, but we're talking about rebuttal to the district's case.
I don't -- I don't understand how they can present even Dr. Ross -- and certainly Mr. Brassow wouldn't be the appropriate witness to provide that rebuttal, but we're talking about rebuttal of our case. I mean, we're still on their case. We're

cross -- that was a cross-examination of their case. Rebuttal is inappropriate.

One thing my co-counsel reminded me --

JUDGE WALSTON: Hang on a second.

JUDGE EGAN: I'm sorry.

MR. GERSHON: Mr. Brassow is not identified as a rebuttal witness anyway. I mean, just to further --

JUDGE EGAN: I'm not too concerned about, given the nature of some of what -- they've left rebuttal open.

My inclination would be to permit him to respond to rebuttal, and I believe it's also Judge Walston's position as well. The concern is the courtesy issue, and if -- knowing what my ruling is going to be on rebuttal, do you have any problem with him testifying to it now, or if you do, and you don't want it done that way, then perhaps we could take his testimony telephonically if those are the only questions that are going to be asked on rebuttal.

MR. RILEY: We can address the courtesy issue, and frankly, it will be extended just the same way to the other parties if there is a strong objection, but we're happy to bring Mr. Brassow to Austin if somehow the courtesy cannot be extended by

the other parties.

JUDGE WALSTON: Do the other parties have an objection to doing rebuttal at this point?

JUDGE EGAN: Mr. Gershon?

MR. GERSHON: Just a moment.

(Brief pause)

MR. GERSHON: I understand your position. We don't have a problem with proceeding right now.

JUDGE EGAN: All right. Then go ahead.

MR. LEE: Okay. I will be brief.

JUDGE EGAN: This is going to be anticipated as rebuttal but as a courtesy is being taken out of order.

MR. LEE: Yes, Your Honor. Thank you.

Q (By Mr. Lee) Mr. Brassow, just to pick up where we left off, you remember there was questions asked of Dr. Ross of whether he had any knowledge of a sanction that was taken by the engineering licensing board with respect to your engineering license. Do you recall those questions?

A I came in at the tail end of those questions, but I understood they're there and that there was some questions about that particular -- about that particular sanction, yes.

Q Okay. I would just like to ask you, if you could, please describe in your own words what were the circumstances that gave rise to that action that was referred to in that document.

A I had inadvertently left my -- I did not send in my fees to the engineering licensing board at the right time in 1998, and it's just one of those things that fell through the crack, quite frankly. And we were submitting information to the TCEQ in a proceeding in which I sealed a figure, and it was brought to my attention that, you know, my license had expired, and I said I would take care of it immediately.

I contacted the board and submitted my fees, was reinstated. What the board didn't say was that the reinstatement was for three weeks due to a date, and I immediately sent in my other fees for the following year. In the interim two days between sending in the fee and receipt, I had signed and sealed another document for the TCEQ, and the board took the position that because they didn't post the check, I was still -- my license was still expired, and that was the basis of their complaint.

Q So is it correct to say that when you found out about the circumstance, you immediately took

action to reinstate your license, and it was reinstated. Correct?

A Absolutely.

Q And when you did the work for the TexCom surface facility application, you were fully licensed as a professional engineer in the state of Texas. Correct?

A Absolutely.

Q And in good standing with the licensing board?

MR. GERSHON: Your Honors, I just need to make an objection for the record. I mean, the rebuttal is to Dr. Ross' understanding of the situation and the credentials of his witness.

JUDGE EGAN: I understand. Your objection is overruled, but you need to limit the question.

MR. LEE: Okay.

Q (By Mr. Lee) My last question was just did you -- when you affixed your engineering seal to the TexCom surface facility application, you were in good standing with the licensing board. Correct?

A Absolutely.

Q Okay.

MR. LEE: I have a document that I'm

going to hand out and mark this as TexCom Exhibit No. 70.

(TexCom Exhibit No. 70 marked)

Q (By Mr. Lee) Do you have a copy of TexCom 70 in front of you?

A I will in one second.

Q What is this document?

A It's a copy of the Court of Appeals case, 14th district. The style is the state of Texas, appellant, vs. Malone Surface Company, Arthur Lee Malone and Larry Malone, appellees.

Q And the case citation is 853 S.W. 2d 82. Correct?

A That's correct.

Q I would like to ask you to turn to Page 4 of that document.

A Okay.

Q In the left-hand column about -- in the first paragraph that's on there that's continued from the previous page, if you look down about halfway, there's a sentence that begins with your name, Carl Brassow.

A Yes, I see it.

Q I'll represent to you that this is the only reference to you in this case decision, and I would like you to just read aloud the sentence that begins

with "Carl Brassow."

MR. GERSHON: Your Honor, I just -- for the record, I want to make a running objection to this line of testimony. This is not designed to address Dr. Ross' testimony.

JUDGE EGAN: You've got a running objection. It's overruled. Go ahead, although this is a legal document, and I believe you gave us the citation to it yesterday.

MR. GERSHON: Oh, and I have no problem with this document being in -- well, recognized by Your Honors or the Commission. What I'm objecting to is the line of questions.

JUDGE EGAN: Go ahead.

MR. FORSBERG: Your Honor, can I make an objection as well?

JUDGE EGAN: Yes.

MR. FORSBERG: I would just like to object to the extent they're going to be asking him about his testimony, the only document we have is this, and if he's going to testify that "I didn't say that," I think we need the entire record of the appeal of this case and his testimony in his deposition.

JUDGE EGAN: I don't know what Mr. Lee's question is, but as soon as he raises the question, if

you have that objection, go ahead and raise it.

MR. FORSBERG: Thank you.

JUDGE EGAN: At this point he's just asked him to read that sentence --

MR. FORSBERG: Okay.

JUDGE EGAN: -- from the document.

Q (By Mr. Lee) Would you please read it, Mr. Brassow?

A "Carl Brassow, MSC's engineering consultant, admitted that as early as June 1982, he believed there was groundwater contamination coming from the pit."

Q Is that a true statement?

A That's a true statement.

MR. FORSBERG: Objection, Your Honor.

JUDGE EGAN: Sustained.

Q (By Mr. Lee) Could you please describe the circumstances that gave rise to -- that underlie this statement?

MR. FORSBERG: Objection, Your Honor; same objection. We would need the record of this case in order to look at this. All we have is the statement of the Appeals Court in front of us with no one from the Appeals Court to say what they considered in making the opinion.

MR. LEE: Your Honor, I'm just asking

for his knowledge of his experiences. He was a witness that gave testimony in the case that led up to this appeal.

MR. FORSBERG: Then where is the testimony?

MR. LEE: I'm asking him what his --

JUDGE EGAN: Hold on. Just direct your comments to me, please.

MR. LEE: Okay. I just want to ask him -- I'm just going to ask him one question, which is, what were the -- please explain the circumstances that led to this statement that's in this court decision.

MR. FORSBERG: He cannot answer --

MR. LEE: I just want to know his personal knowledge of what happened.

MR. FORSBERG: He cannot answer that, Your Honor --

JUDGE EGAN: Sustained.

MR. FORSBERG: -- because it's the Court of Appeals --

JUDGE EGAN: Sustained.

MR. FORSBERG: Thank you.

MR. LEE: We have no further questions.

JUDGE WALSTON: Were you going to offer

that into evidence, or take official notice?
MR. LEE: Yes, please. Thank you.
Thank you, Your Honor.
JUDGE EGAN: Then any objections to TexCom Exhibit No. 70?
(No response)
JUDGE EGAN: None. Then it's admitted.
(TexCom Exhibit No. 70 admitted)
MR. LEE: We have no further questions.
JUDGE EGAN: Any further questions from Lone Star?
MR. HILL: No, Your Honor.
MR. FORSBERG: No, Your Honor.
JUDGE EGAN: Then you're excused.
A Thank you, ma'am.
JUDGE EGAN: Thank you.
Would you like to call your next witness?
MR. RILEY: We actually don't have any more witnesses.
JUDGE EGAN: Would you like to offer the written depositions?
MR. RILEY: Yes, ma'am. We would like to offer into the record in the TexCom direct case TexCom Exhibits 62 and 63, which are depositions on

written question taken of certain TCEQ personnel.
JUDGE EGAN: Exhibit 62, which is Kathryn Hoffman's written questions, there was no objection filed to this previously. It is admitted.
TexCom Exhibit No. 63, which is the written questions -- deposition questions of Michael D. Graeber --
MR. RILEY: Graeber.
JUDGE EGAN: -- Graeber, likewise had no objection so it is admitted as well.
(TexCom Exhibit Nos. 62 and 63 admitted)
JUDGE EGAN: Anything further from TexCom?
MR. RILEY: No, Your Honor. That is TexCom's direct case.
JUDGE EGAN: Let me make sure I know the order that the parties are going to be presenting. Is it Lone Star first, the same order that we've been doing the cross-exams?
MR. GERSHON: Right.
JUDGE EGAN: All right. And just before we go on, let me make sure. Did you have a chance to look at the verification of that last exhibit, exhibit number -- Lone Star Exhibit No. 19? If you haven't, that's fine.

MR. RILEY: I really haven't had a chance. I will clean that up before tomorrow morning or tomorrow.
JUDGE WALSTON: I just note that on my notes, I didn't show that one being subject to verification.
MR. RILEY: We have the same notes, but, again, let me take a look at it and just confirm.
JUDGE WALSTON: 17 and 18 I had written down.
JUDGE EGAN: No. 19 I had written down.
MR. RILEY: I think I might have had some --
JUDGE EGAN: Subject to verification. It was a letter from TCEQ, so you just wanted to make sure it was an exact copy.
MR. RILEY: And I wanted to make sure it was -- that was the exact part.
JUDGE EGAN: That was my recollection. All right.
Is Lone Star ready to proceed with its direct case?
MR. GERSHON: We certainly are, Your Honors. Our intentions are to begin with our first witness as is in the order of our prefiled testimony.

That said, depending how -- well, I'll tell you what.
Our second witness is Ray Shull, and it looks like we'll be getting to Mr. Shull before the end of the week, so this is going to work.
We might need to take our third expert out of order in order to allow Ms. Hoffman to provide testimony tomorrow. It's my understanding that --
MR. WILLIAMS: Monday.
MR. GERSHON: I thought that she needed to be put on by tomorrow. If it's Monday, then this will work in order. So we would call Ms. Kathy Turner Jones at this point.
PRESENTATION ON BEHALF OF THE LONE STAR GROUNDWATER CONSERVATION DISTRICT
(Witness sworn)
JUDGE EGAN: Would you state your full name for the record?
A Kathy Turner Jones.
JUDGE EGAN: Can you-all hear in the back?
UNIDENTIFIED SPEAKER: No.
JUDGE EGAN: Mr. Gershon, are you going to be the --
MR. GERSHON: Yes.
JUDGE EGAN: Go ahead and proceed.

KATHY TURNER JONES,
having been first duly sworn, testified as follows:
DIRECT EXAMINATION
BY MR. GERSHON:
Q Good afternoon, Ms. Jones. Do you have a copy of your prefiled testimony with exhibits in front of you?
A Yes, sir.
Q Okay. And it isn't the copy that has notes or the working copy. It's an actual copy of what was just handed to the court reporter in the same form. Is that right?
A Yes, sir.
Q And let me take one step back. Ms. Jones, is it -- do I have it right that you're the general manager of the Lone Star Groundwater Conservation District?
A Yes, sir.
Q Okay. And in that capacity, did you develop the prefiled testimony that I just referred you to?
A Yes, sir.
Q Okay. Do you have any corrections to that testimony?
A Not that I'm aware of.
Q Okay. And is it your intention to offer up

and to provide that testimony as you would have provided it if you were presenting it in a live hearing?
A Yes.
MR. GERSHON: With that, I would offer up District's Exhibits 1 through 4.
JUDGE EGAN: Okay. All the objections were previously ruled on in this case. So Lone Star's Exhibits 1 through 4 are admitted.
(LS/District Exhibit Nos. 1 through 4 marked and admitted)
JUDGE EGAN: And just the way we'll go in this order will be Montgomery County/Conroe next, individual protestants after that, then the TexCom, then --
MS. COLLINS: I would probably go before TexCom.
JUDGE EGAN: Would you like to go --
MS. COLLINS: That's fine.
JUDGE EGAN: That's fine with me. And then the ED last.
So at this point any cross from Mr. Walker? Go ahead.
MR. WALKER: Thank you, Your Honor. Protestants Montgomery County and the city of Conroe

have no questions.
JUDGE EGAN: Ms. Collins? Excuse me. Mr. Forsberg? That's the hazard of being behind the podium where I can't see you.
MR. FORSBERG: We have no questions at this time, Your Honor.
MS. COLLINS: No questions.
MR. RILEY: That was quick.
JUDGE EGAN: Mr. Riley?
MR. RILEY: Yes. Thank you, Your Honor.
CROSS-EXAMINATION
BY MR. RILEY:
Q Good afternoon, Ms. Jones.
A Good afternoon.
Q I just have just a few questions, and I apologize in advance of attempting to use new technology and read from the screen. So we'll see how that works out.
I understand that you've been the general manager of the Lone Star Groundwater Conservation District for five years. Is that correct?
A Yes.
Q Is it all right for purposes of our discussion this afternoon if I refer to that

organization as Lone Star just for ease of reference?
A Yes.
Q When was Lone Star actually authorized by the state of Texas?
A It was created in 2001.
Q And you've been general manager then for almost the entire time?
A Yes, sir.
Q As I understand your testimony -- your prefiled testimony, you have a degree in business. Is that correct?
A Yes, sir.
Q With a minor in finance?
A Yes, sir.
Q That will become relevant as I ask you questions about the SEC filing that you make an exhibit to your testimony. That's why I asked.
You don't have technical training in any of the sciences that have been discussed in the course of this case?
A No, sir.
Q And I think your testimony makes clear that the groundwater district relies exclusively on the consultants that it has hired in this case for its opinion regarding the protectiveness of the

application. Is that correct?
A Yes.
Q I did see -- and forgive me, again, because of my limitations, technologically speaking -- I did see where you had in your testimony that you were not able to gain access to the application of TexCom prior to September 2007. Is that correct?
A We could not get a complete copy of the application prior to that time.
Q All right. Could you tell me all the efforts you made to do that?
A We went to the courthouse where the volumes were located. Not all of the volumes were complete. It was felt like it was not a complete set.
We also contacted TCEQ, and it was our understanding that central records had misplaced a copy. The copy that the staff had at TCEQ was marked up and could not become available, and we did ask for copies from TexCom and were not provided them until September.
Q Do you know when you asked?
A Not specifically.
Q Do you know how long after you asked you were provided with a copy?
A It seemed like a long time. No, I do not

have that.
Q The essence of your testimony is that you have concerns, based on your experts' opinions, about whether the TexCom project could endanger a drinking water source that is relied on by residents of Montgomery County. Is that a fair summary?
A Yes.
Q And have you been in the hearing room for the entire session since yesterday morning?
A Yes, sir.
Q And have you heard TexCom's experts testify?
A Yes, sir.
Q At some time was there an invitation extended to you to meet with TexCom's experts prior to actually seeing them testify in this hearing?
A We received a call from the county attorney's office.
MR. GERSHON: Objection, Your Honor. If counsel is trying to get information about settlement opportunities, those are inadmissible.
JUDGE EGAN: Is this regarding the settlement discussions or settlement opportunities?
MR. RILEY: No. It was an invitation to have a technical discussion with the groundwater district prior to today.

MR. GERSHON: That's an incorrect assessment.
JUDGE EGAN: If it's anywhere near settlement, let's avoid it.
MR. RILEY: I'll stay away from it, I just wanted to be clear since the witness testifies about their lack of knowledge and opportunity to understand the extent of the TexCom project, I thought it was a fair topic for examination.
MR. GERSHON: May I respond? That's a loaded question. I have exchanged e-mail correspondence with counsel on that particular meeting, and he's mischaracterized the nature of that meeting. It's just inappropriate.
JUDGE EGAN: We're not going to be considering it. So go ahead and proceed.
Q (By Mr. Riley) When did you hire experts to assist the groundwater district, or Lone Star, in assessing the TexCom application?
A When I became aware of the permit, we contacted, several days prior to the hearing on July 18th, a consulting firm in Houston to do a preliminary review of the application.
Based on some comments or recommendations from this firm, we then engaged our

legal team to advise us where we needed to go, and, therefore, they hired the expert -- or they are the ones that engaged the expert witnesses.
Q I'm sorry. "This firm," which firm are you referring to?
A As far as the initial firm that reviewed the applications?
Q Yes, ma'am.
A LBG Guyton & Associates.
Q I'm sorry. I couldn't hear you.
A LBG Guyton & Associates.
Q LBG Guyton?
A Guyton, G-U-Y-T-O-N.
Q And were they the consultants that have provided testimony in the hearing?
A No, sir.
Q No?
A No.
JUDGE EGAN: Just make sure that he finishes asking you a question before you answer it so the court reporter can take you both down accurately.
A Yes, ma'am.
Q (By Mr. Riley) So there was a consulting firm that you visited with first or engaged, and they made the recommendation for your experts in this case?

A Yes, sir.
Q Who specifically did you work with at LBG Guyton?
A John Saffert.
Q Now, I understand as general manager, and in your prefiled testimony, that you have concerns about TexCom's waste disposal proposal, the Class I well that's proposed in part of this proceeding.
Have you heard the discussion -- or did you hear the discussion about Railroad Commission Class II wells in stratum that are higher or closer to the surface that also are in the area of the groundwater resources that you're concerned with?
A Yes, sir.
Q And can you tell me all of the actions or activities that you've been involved with -- or Lone Star has been involved with in your participation in those permitting matters?
A None.
Q Do you have concerns about Class II wells that are operating in the same area where the TexCom proposal would be located?
A If there's a potential for contamination, yes, sir.
Q And as part of your duty as a groundwater

district, do you expect that you'll be investigating those activities?
A If it comes to our attention that there is the instance of that occurring, yes, sir.
Q Do you not consider the testimony in this proceeding to call it to your attention?
A Not specifically, no, sir.
Q The fact that there are 53 or so operating Class II disposal wells that do not subject the material to testing before being injected into the Vicksburg and the Frio strata, that didn't spark your interest or cause you concern?
A There is concern, yes, sir.
Q Do you expect that the district will take action with respect to that concern?
A I'm sure we will consider it.
Q As it pertains to this application, did you understand the geology and the discussion that was diagrammed at the board as to where the TexCom disposal well will be completed?
A Yes, sir, on a basic level. I'm sure to the depth that you're probably going to question me maybe not.
Q I'm not actually going to question you very deeply, and I'm just going to ask you whether you

appreciated the difference between the freshwater aquifers that you are concerned with and the geologic layer that TexCom is proposing to inject into?
A Yes, sir.
Q Have you had that explained to you prior to the testimony in this case?
A Yes, sir.
Q Had you had any discussion with your experts regarding the Class II disposal wells that I mentioned just a moment ago?
A No, sir.
Q Was that news to you?
A No. We're aware that there's disposal wells. I think it would be also important to point --
Q I'm sorry to interrupt you, but it generally works better if I ask you a question.
JUDGE EGAN: Mr. Riley, I'll instruct the witness, but you need to wait until he asks you a question before you can answer. And your attorneys can go back if they want you to say anything else.
Go ahead, Mr. Riley.
MR. RILEY: I'm sorry.
Q (By Mr. Riley) But to be courteous, is there something you wanted to say?
A Yes, sir. I just wanted to add that we're

not opposing wells of this type. It is the risk factors that are involved in this that has caused the district to have concerns of the possible contamination.
Q I understand. So let's --
A We realize there is benefits to disposal wells.
Q I want to talk about that with you. So why don't we talk about that at this time since you bring it up?
You heard the description of the Conroe field that's been offered, mostly in cross-examination, about it being highly fractured or highly faulted. Did you hear those questions?
A Yes, sir.
Q So when you say you're not generally opposed to disposal wells, are you opposed to disposal wells anywhere in the Conroe field?
A I would defer that to experts that would give us the guidance based on the specific information and would rather not answer that question.
Q What I'm asking you --
A I do not have an answer.
Q The discussion, as far as you understand it, was general geology of the Conroe field and a number

of artificial penetrations. Do you remember that part of the discussion?
A Yes, sir.
Q And my question is, since you made the statement that you're not generally opposed, I'm trying to understand what you mean by "you're not generally opposed."
Is there a particular aspect of this application that leads you to the position that you're opposed to the TexCom application?
A Again, this is information our experts have provided to us that they feel like the risk factors involved are significant enough to cause contamination. Based on that, the district's position would be to oppose this well, and I will leave it to them to explain those risk factors.
Q Since you're giving the district's position, we would like to understand what you understand the risk factors to be.
A Again, they're technical, and I will let them explain.
Q So you have no understanding independent of what experts say as to what risks are associated with the TexCom project?
A I think I have answered that, that it's,

again, technical, and it is their responsibility to answer. I would be more confident in their response.
Q Is your answer "yes" to my question then, that you have no independent evaluation of the risks. You're totally dependent --
A No, I do not have an independent evaluation.
Q Thank you. There are some parts of your testimony that deals with your concerns regarding TexCom's financial capabilities. Right?
A Yes, sir.
Q Could you explain the nature of your concern?
A We had requested financial information from TexCom, and this was never produced through discovery. The only information the district has been able to obtain is information from the Securities & Exchange Commission, that is dated 2004, which indicates an unstable picture for TexCom, Inc., which is the parent company of TexCom Disposal.
Q With respect to the TCEQ program that we're discussing in this hearing, are you aware of the financial assurance requirements that are part of the underground injection control well such as TexCom has proposed?
A Yes, sir.
Q And what do you understand them to be?

A That they would have a bond in case of -- to remedy any situation, but we have concerns without some type of financial security that this is a viable facility and operation.
Q And while I understand what you're saying, I'm asking you to address the bonding requirement. You're familiar with the bonding requirement?
A Yes, sir.
Q You understand that the bond has to be in place. Correct?
A Yes, sir.
Q You do understand the bond is in place --
A Yes, sir.
JUDGE EGAN: One at a time, please.
Q (By Mr. Riley) -- with respect to the well that exists presently, WDW315?
A Yes.
Q And at least as it pertains to the financial assurance requirements of the TCEQ, do you have any reason to doubt that those have been satisfied?
A That the bond has been secured?
Q Yes.
A I have no reason to doubt.
Q So as far as you know, in spite of your more general concerns based on some SEC filings, you

understand the financial assurance requirements to have been satisfied?
A Yes, sir. They have secured their bond.
MR. RILEY: Thank you, ma'am. I have no further questions.
JUDGE EGAN: Any redirect?
Oh, I'm sorry. Ms. Goss?
MS. GOSS: I'm sorry. Excuse me.
(Brief pause)
CROSS-EXAMINATION
BY MS. GOSS:
Q Good afternoon, Ms. Jones. I'm Diane Goss, representing the Executive Director, and I just have a question for you -- one question for you.
The question is: Could you explain more about the circumstances of your inability to obtain the application from the place it was posted at the county?
A We worked closely with the county attorney's office. They had made numerous requests for copies of the application. Once our legal team was engaged in this process, they also requested copies from TCEQ.
I personally did not call TCEQ, but I do have confidence in -- and communication from the attorneys that these requests were made, and copies

could not be produced, mainly because the file copy could not be found, and the working documents could be provided because of your notes.

Q Are you aware of a copy that was on record with the county that the applicant had placed with the county?

A Yes, ma'am. This is the copy that I referred to that we felt like was not complete, in that volumes had been checked out for copying, and there was some lack of confidence that that had been returned intact.

We also know for a fact at different times TexCom would come and replace copies or documents within that. So we never knew whether it was up to date at the time or actually still complete.

MS. GOSS: Thank you very much. I have no further questions.

JUDGE EGAN: Okay. I haven't missed anyone else. Right? Any redirect?

MR. GERSHON: No redirect, Your Honors.

JUDGE EGAN: Okay. You may be excused. Thank you.

MR. GERSHON: At this time, we would call Mr. Shull -- Ray Shull.

(LS/District Exhibit Nos. 5 through 7 marked)

(Witness sworn)

JUDGE EGAN: Would you state your full name for the record?

A My name is Ray Lee Shull.

JUDGE EGAN: You may proceed.

MR. GERSHON: Thank you, Your Honor.

RAY LEE SHULL,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. GERSHON:

Q Good afternoon, Mr. Shull.

A Good afternoon.

Q Have you been retained to evaluate and produce opinion on behalf of the Lone Star Groundwater Conservation District in this case?

A Yes, I have.

Q And are you an engineer?

A Yes, I am.

Q And in that capacity as an engineering consultant working on behalf of the district, have you provided written prefiled testimony in this case?

A Yes, I have.

Q Do you have any corrections to that prefiled testimony -- that written prefiled testimony?

MR. GERSHON: And let me clarify.

Probably a week ago, there was a submission of what I would describe as typographical corrections that were served on all the parties and filed with the Judges.

Q (By Mr. Gershon) Beyond those corrections, did you have any additional corrections?

A No. Those corrections appear to be in the exhibit in front of me, and I have no further corrections to it.

Q So it's your intention that this prefiled testimony be proffered into this case as if you were providing live testimony. Is that correct?

A That is correct.

Q Okay.

MR. GERSHON: Then I would move for admission of District's Exhibits 5 through 7, recognizing the Judge's ruling on objections earlier this week and the exclusion of certain testimony based on those rulings.

JUDGE EGAN: District's Exhibits 5 through what?

MR. GERSHON: 5, 6 and 7.

JUDGE EGAN: Thank you.

MR. RILEY: I don't have an objection, but I am curious as to whether the record copy has actually been corrected.

JUDGE WALSTON: I was about to ask that, too. As far as the objections go, have those portions been redacted?

MR. GERSHON: They have not. We -- they have not.

MR. RILEY: I thought it was part of your order. I may be mistaken, but I have no objection as long as eventually it gets done.

MR. GERSHON: We can accomplish that.

JUDGE EGAN: All right. Subject to our orders on the objection, then District Exhibit No. 5 -- or Lone Star District Exhibit Nos. 5, 6 and 7 are admitted.

And those portions of the prefiled that the objections are sustained need to be redacted prior to the close of the hearing, our copies and the court reporter's copy.

(LS/District Exhibit Nos. 5 through 7 admitted)

JUDGE EGAN: Who is it going to be? Ms. Stewart?

MS. STEWART: We have no questions.

JUDGE EGAN: Okay. Mr. Forsberg?

MR. FORSBERG: No questions, Your Honor.

JUDGE EGAN: Ms. Collins?

MS. COLLINS: No questions, Your Honor.
JUDGE EGAN: Mr. Riley? Mr. Lee?
MR. RILEY: Actually, I have a request. Could we have -- I apologize to Mr. Shull. Can we have a ten-minute break? The witnesses have gone pretty quickly this afternoon, more quickly than I anticipated. I need to get some paper in front of me so I can do this efficiently. I'll count the time against me, whatever you like.
JUDGE EGAN: I'm fine with a ten-minute break. Anybody have a problem with that?
(No response)
JUDGE EGAN: We'll come back at 25 till 5.
MR. RILEY: Thank you.
(Recess: 4:25 p.m. to 4:39 p.m.)
JUDGE EGAN: We're back on the record. Mr. Riley, are you ready to proceed?
MR. RILEY: Yes, Your Honor. Thank you.
JUDGE EGAN: Go ahead.

CROSS-EXAMINATION

BY MR. RILEY:

Q Good afternoon, Mr. Shull.
A Good afternoon.
Q Mr. Shull, as I understand it, you are a

licensed professional engineer in the state of Texas. Is that correct?
A That is correct.
Q And how long have you held that distinction?
A Since 1980.
Q How do you generally, in general terms, make your living?
A As an engineer.
Q What types of engineering do you -- typically are you engaged in?
A Solid waste disposal, wastewater treatment and collection system design, water treatment and distribution and transportation-type projects.
Q So is it fair to say that a good portion of your personal business is in the area of engineering solid waste disposal facilities?
A Yes, it is.
Q Is it accurate to say, Mr. Shull, that a large part of your work is in the landfill waste disposal business?
A Yes, that's accurate.
Q And how many years has that been true, sir?
A Since probably 1982, '83.
Q 1982 or '83?
A Yes.

Q Do landfills accept -- of course, I'm speaking very generally. Can landfills, if properly permitted, accept liquid solid waste that is considered Class I industrial non-hazardous?
A If they're properly permitted, yes.
Q Have you ever been involved with any landfill site that has been permitted to accept liquid Class I non-hazardous waste?
A Yes.
Q And what specifically -- what landfills have you specifically been involved with?
A The Tessman Road landfill in Bexar County near the city of San Antonio owned by Allied Waste, also known as BFI. It's a municipal Type 1 landfill permitted to accept Class 1 waste, including liquid waste. That's one.
Q Are there others?
A A landfill -- at the time we did it, it was initiated by Western Waste Company in Newton County. It had a Class I component of -- that was a landfill, and I believe it was also permitted to accept liquid waste.
Q Is it legal, Mr. Shull, in your experience, to -- dispose of liquid Class I non-hazardous industrial waste straight into a permitted municipal

solid waste landfill?
A No, that's not allowed.
Q What has to happen in order for the waste to be disposed of in a municipal solid waste landfill?
A The liquids have to be treated and solidified so that there's no free liquids prior to disposal in the landfill.
Q How typically are such liquid wastes solidified by a landfill?
A Typically by the addition of solidification agents that convert it from a liquid to a solid.
Q Are you familiar with any of those solidification agents?
A Yes, I am.
Q What are some of them?
A They typically are, in my opinion, two types; ones that either absorb the liquids into a solid media such as sawdust or even rice hulls are used oftentimes.
JUDGE EGAN: Rice --
A Rice hulls -- to such things that chemically fix the liquid within -- such as a cement and fly ash and other fine particles like that that actually absorb the liquids into a chemical matrix I'll call it.

Q (By Mr. Riley) How does one determine when a Class I non-hazardous industrial waste is solid enough for disposal into a permitted municipal solid waste landfill?
A Typically there's a test called a paint filter test where you take a sample of the waste and put it in a paint filter and see if liquids emerge from that sample.
Q And if no liquids emerge, I assume then it's considered a solid at that point and able -- or capable of disposal into a municipal solid waste landfill?
A Yes, that's correct.
Q Is that your experience?
A Yes, it is.
Q What type of municipal solid waste landfills in the Conroe area or Montgomery County are there that accept Class I non-hazardous industrial waste?
A There's a landfill -- I believe it's currently operated by Waste Management. I did the -- I did a lot of engineering on the original conversion. It was a municipal landfill within the city limits of Conroe, and we converted it by a permit to a Class I non-hazardous industrial waste landfill. And it was owned by Western Waste Industries at the time, which

evolved into Waste Management now.
Q In fact, it's still -- a Western Waste entity is the entity that actually operates that landfill. Correct?
A I don't know. I haven't been involved with that for probably ten years.
Q The -- do you know -- well, I guess you have no current knowledge of the waste acceptance practices at the Western Waste landfill in the Conroe/Montgomery County area?
A No. Again, as I said, I haven't been involved with that facility for approximately ten years.
Q Is it fair to assume -- and I don't mean to -- well, actually let me just ask.
What is the most recent experience you've had with a Class I municipal solid waste landfill or solid waste landfill that's permitted to accept Class I waste?
A The most recent experience would be with the Tessman Road landfill, which is a Type 1 landfill in Bexar County, and also the Gulf Coast landfill, also operated by BFI in Chambers County, which is an industrial landfill. I'm currently working on both of those facilities.

Q Could you distinguish for us the difference between a municipal solid waste landfill and an industrial landfill?
A If you could narrow that question down by in what respect?
Q I'm sorry. That's fair. In terms of the types of waste that could be accepted by one versus the other.
A Yes, I can do that. A Type I municipal landfill typically takes municipal waste, solid waste. If they also are permitted to accept Class I industrial waste which is non-hazardous, then they will typically have a dedicated cell where that Class I waste is deposited in and placed.
And if they're also permitted to accept liquid waste, they'll typically have a solidification facility where they solidify the waste before it's placed in the Type I cell.
An industrial facility does not take any municipal waste. It takes only industrial waste.
Q And I appreciate that, Mr. Shull. The process of solidification, I would like to discuss that a little bit further.
Is it accurate then, based on your earlier answer, that municipal solid waste landfills

or industrial waste landfills that are permitted to accept Class I liquid non-hazardous waste must take some action with respect to that waste before it can actually put it into a landfill cell? Is that correct?
A That is correct.
Q That's the processing that we were talking about just a moment ago called solidification?
A Yes, or stabilization. I've heard it called both terms.
Q And you've mentioned already that some stabilization or solidification agent that would be employed at a landfill site to render the waste acceptable for disposal into the landfill. Right?
A Yes, I have.
Q Now, tell me about a landfill -- a municipal solid waste landfill. Does it have a protective -- how is it protective of the human health and environment in terms of the landfill cell itself?
A Well, there's numerous factors. Could you be more specific on what you're asking, please?
Q Well, why don't you give me a list? And start with the most -- the highest priority, I suppose, or the thing that you would consider most protective of the human health and the environment as

pertains to a municipal solid waste landfill.
A Well, I don't know that I can categorize. Every feature in a landfill design is generally intended to be protective of human health and the environment.
Q Then we agree. What I would like to focus on then, just to draw your attention to a particular aspect, is the liner system. Is that sort of where the story begins, so to speak?
A Well, that's the bottom component and the initially constructed component of most landfills.
Q If I understand the general nature of the landfill liner, it has evolved over years, but there's a federal statute referred to as Subtitle D that sets some parameters for what must be included as part of a landfill liner. Is that correct?
A That is correct.
Q And we refer to modern landfills as Subtitle D landfills. Is that also correct?
A Municipal landfills are typically referred to as Subtitle D compliant landfills.
Q As a Subtitle D landfill, is there a prescriptive liner design; in other words, one specified by rule or statute that is considered Subtitle D compliant?

A Yes. It's called a composite liner system, and it's typically composed of two feet of compacted clay material to meet a defined permeability, and then a plastic component placed on top of that two feet of clay and then a protective layer on top of the plastic and then a leachate collection system typically is put on top of that layer to collect any liquids that might percolate down through the waste.
JUDGE EGAN: So the bottom layer is clay -- two feet of clay, and then there's -- what is the next layer?
A A layer of plastic, high density polyethylene, HDPE.
JUDGE EGAN: Then there's a layer --
A There's a protective layer on top of the plastic to keep it from being punctured when waste is placed on it.
JUDGE EGAN: What is that protective layer?
A It's usually additional soil material. It can be clay, doesn't have to be, because low permeability is not a requirement for that, but it depends upon the type of material that's available at the site usually, and then on top of that you construct your leachate collection system or layer

which has several components to it.
JUDGE EGAN: Okay.
Q (By Mr. Riley) While we're on the topic, on the last point, what is leachate?
A Leachate is liquid that migrates through or is initiated from within the waste that collects at the bottom of the waste thickness and is collected by the leachate collection system.
Q And if I'm understanding correctly then, the water filters through the disposed material, collects at the bottom, and that's referred to as leachate?
A That's correct.
Q And are there chemical constituents that are typically found in leachate?
A Yes.
Q And can you name some of them?
A Well, it depends upon, of course, the waste that is percolating through as far as the waste column, but there's organics, there's inorganics, there's metals, lots of different compounds in there.
Q And if you know, Mr. Shull, how is leachate that is collected at a municipal solid waste landfill typically disposed of?
A A variety of methods. It can be treated on site and discharged. It can be hauled off site to

treatment by another type of treatment system, either a municipal system or a commercial private treatment system. I've seen leachate evaporated on site. I've seen leachate boiled on site until it's gone. Leachate can be recirculated back into the waste.
Q Did you say boiled?
A Yes. It's considered on-site thermal treatment.
Q Do you see a lot of that these days?
A Not a lot of it, no.
Q But how is leachate classified, if you know, as -- in the waste classification system at the TCEQ?
A It depends upon the source and the facility where the leachate originates.
Q So if it's a municipal solid waste landfill and there's Class I industrial waste as part of the landfill waste acceptance authorization, does that narrow the field of choices as to how the leachate would be classified?
A I believe it does, yes.
Q Do you know what the classification would be for leachate that filters through the waste in a municipal solid waste landfill that is authorized to take Class I non-hazardous industrial waste?
A Well, a Class I cell at a municipal landfill

is required to receive only Class I waste, and when it's closed out, they put a protective cap on the top of it, typically three feet of soil, to separate the Class I waste from the municipal waste, and I believe the leachate from that Class I cell is treated separately from the other leachate at the site, if it's disposed of off site.

Q Do you know if it's treated differently because it is considered a Class I non-hazardous industrial liquid waste?

A I believe that's correct.

Q In your experience, how has leachate been disposed of when it is disposed of from the municipal solid landfill sites that you've worked at?

A Predominantly either disposal off site at a publicly owned treatment works, or POTW, or disposed of on site by recirculation.

Q What is a POTW? You've used that term a couple of times, and I just want to get it clear.

A I think, as I just said, a publicly owned treatment works.

Q I didn't hear that part. I just heard POTW. I apologize.

A I'm sorry.

Q Now that I understand what the terms mean,

what is your understanding of what is a publicly owned treatment works?

A It's a wastewater treatment facility owned or available to the public.

Q Have you had any experience with the design or permitting of a wastewater treatment plant?

A Yes, I have.

Q Have you had any experience in the design or permitting of a publicly owned wastewater treatment plant?

A Yes, I have.

Q And am I correct then, Mr. Shull, that a publicly owned wastewater treatment plant could accept Class I non-hazardous industrial waste?

A My experience is that typically that requires some type of pretreatment or preacceptance to show that that wastewater would not be incompatible with the treatment works at the wastewater treatment plant.

Q With that caveat then, can a POTW set pretreatment standards for Class I non-hazardous industrial waste -- liquid, of course -- and receive Class I non-hazardous industrial waste?

A Mr. Riley, I don't know. I've never been in that situation where a POTW that I was involved with had a request to receive Class I non-hazardous liquids

just on its face value.

Q All right. Are you aware of a pretreatment program, though, that would at least, in theory, authorize the receipt of Class I non-hazardous industrial wastewaters into a POTW?

A Yes. Most publicly owned treatment works have an industrial pretreatment program where industrial discharges have to meet certain standards for the concentration limits of the pollutants into that system, and if they meet those, then they can discharge that wastewater to that system.

Q All right. Once the wastewater is discharged to that system, what happens in a wastewater treatment plant?

A The short answer is the wastewater is treated.

Q That's a good short answer. Could you be a little more -- elaborate a little further?

A Well, it depends upon the type of treatment. There's, you know, typically biological treatment systems. There's physical treatment systems, and then there's chemical treatment systems.

Those are the three broad categories, and within each one of those broad categories, there's a number of different types of treatment mechanisms

that are employed. So if you could narrow your question down, I'll try to answer it.

Q I'll try to narrow it down or maybe even cut to the end of it. After treatment in a wastewater treatment plant, what, in your experience, happens to the wastewater that has been treated?

A The wastewater that is treated is typically either discharged to a receiving stream through an authorized permit; reused in some fashion, also through an authorized permit. I would say possibly recycling can factor into that because they can reuse wastewater for irrigation purposes and things like that. That's certainly the vast majority of the ultimate disposal of that treated wastewater.

Q As between the three that you mentioned; discharge, reuse or recycle, which would you expect the greater volume of wastewater from a wastewater treatment plant -- where would you expect that to go?

A Well, if you're talking about in the state of Texas, the majority of the volume is treated and then discharged.

Q And discharged to the surface waters. Is that correct?

A That is correct.

Q And those same surface waters are often used

as drinking water sources. Is that correct?
A Oftentimes they are.
Q Have you been present for the testimony over the last couple days, the entirety of testimony?
A No, I have not.
Q Do you consider disposal of Class I non-hazardous industrial waste into a properly authorized municipal solid waste landfill to be a conscientious and protective way to dispose of that waste?
A I don't know enough about that to have an opinion.
Q But you've participated in permitting of facilities that could do that. You don't have an opinion as to whether that's protective of human health and the environment?
A I don't understand your question.
Q I may have balled it up, and I didn't mean to. I'm asking you whether -- I think we discussed that you've worked with municipal solid waste landfills that receive Class I non-hazardous industrial wastewater, solidify it and dispose of it into the landfill.
A Yes, I have.
Q I thought I heard you say you had been

involved in the design of some of those landfill facilities.
A Yes, I have.
Q Do you consider that activity, if done properly and disposed of in a municipal solid waste landfill that is properly authorized, to be protective of human health and the environment?
A Yes, I do.
Q That's the essence of my question, is that the liner system that you described, three feet of compacted clay, the leachate collection system, the various other elements you described, is that one of the elements of protectiveness that you would draw on in making that answer -- or forming that answer?
A Well, I said two feet of clay for the standard municipal liner system, but, yes, that is correct.
Q With the exception of my poor memory of two feet or three feet clay -- less clay than what I remembered -- two feet of clay, you would still consider that to be protective of human health and the environment?
A Protective in what regard, sir?
Q The same way I was asking the question, that if Class I waste is disposed of in a municipal solid

waste landfill with a Subtitle D liner, you would consider that to be protective of human health and the environment?
A The reason I'm hesitating is that I believe there may be a requirement that under the Class I cells of a landfill you might have to go to three feet of clay. With that condition, yes.
Q Okay. So some remnant memory in my head might have factored in there. Let's use three feet of clay.
A I think that's right.
Q And I'm tapping into your experience in the landfill industry because alternate types of disposal have become at least a part of the discussion in this case. So I want to borrow you, so to speak, at this time and talk about alternate types of disposal for Class I non-hazardous liquid wastes.
A Okay.
Q That's why I've been asking these questions. Have you worked for any landfills that are authorized to receive the type of waste I just mentioned that overlie drinking water aquifers?
A I'm not sure exactly what a drinking water aquifer would be.
Q Let's go with the common sense definition; an

aquifer where would one would withdraw water for drinking.
A Okay. And since I'm not a geologist, that's not the area of the application that I usually prepare.
Q Okay. A landfill application?
A Yes.
Q The Western Waste facility that you mentioned you worked for ten years ago in the Conroe area -- are you familiar with the drinking water resources in the area of Conroe?
A No, I'm not.
Q You're retained in this case by the Lone Star Groundwater District. Correct?
A That is correct.
Q Have you had conversations with Ms. Kathy Jones, who testified a short while ago, about the groundwater resources in the Conroe area and Montgomery County more generally?
A No, I have not.
Q Have you had conversations with Ms. Jones about your opinions in this case?
A No, I have not.
Q Mr. Shull, we've met not only prior in this case where I took your deposition, but on other

occasions we've met before. The reason for that brief preamble is to orient you that your description of experience, as it pertains to this application, seems somewhat limited -- is that fair -- in other words, experience with underground injection control wells and surface facilities related thereto.
A Yes, it's somewhat limited.
Q And somewhat limited to this case. Is that also true?
A On underground injection wells, I've had some limited experience with those in the past.
Q How far in the past?
A Over ten years.
Q So more than ten years ago, you had some limited experience with underground injection control wells. Correct?
A That is correct.
Q I think, if I remember correctly -- and, please, if you remember differently, tell me, or if the reality is different, tell me -- that when I asked you if you had ever reviewed the Chapter 331 rules prior to being retained in this case -- Chapter 331 rules of 30 Texas Administrative Code -- I believe you informed me that you had not. Is that correct?
A If I have, it's been very, very limited.

Q So most of your knowledge, if not all of your present knowledge, is related to your work and being retained in the present case that we're here gathered to discuss?
A With some very limited exceptions, yes.
Q Would that still be the same exception, about ten years ago you remember some limited exposure or limited experience in underground injection control wells?
A Yes, I have some exposure to them, but I have never prepared any applications for those types of wells.
Q Now, you do have, in spite of not an abundance of experience -- or actually, you've described your experience -- opinions as to whether the application meets the requirements of TCEQ rules. Is that true?
A And which application are you talking about?
Q That's fair enough. How many applications are pending in this case, if you know?
A My understanding is there's an application for the unground injection well and also, separately, an application for the surface facilities.
Q Which one were you engaged to review?
A The surface facilities.

Q From this point forward, can we agree to be discussing that application then, since I wouldn't expect you to have an opinion as to something you didn't review?
A Yes.
Q So with regard to the surface facility, have you ever permitted a surface facility or been involved in the engineering of a surface facility that correlates or relates to an underground injection control well?
A No.
Q Your opinion, though, as expressed in your prefiled testimony, is that the surface facility does not meet the TCEQ requirements. Correct?
A That is correct.
Q And what are those requirements?
A In my review, I looked at the application form prepared by the TCEQ, Form INS-0024, and looked at what were the requirements to be developed and prepared in the application, and compared the TexCom application to those requirements.
Q So it was your interpretation of the requirements in the TCEQ application form that forms the basis of your conclusion that TexCom did not meet the requirements of TCEQ rules?

A That's a large part of the basis, yes.
Q When you say, "large part," it sounds like a hedge. So I want to understand the full basis for your opinion.
A Additionally, I reviewed the TCEQ rules that related to this application that I could locate and tried to see if there were other requirements in those rules.
Q And were you successful in that endeavor?
A Successful in what manner, sir?
Q In identifying TCEQ rules that you think are applicable to the application for the surface facility that we're here to discuss.
A The application form referenced rules -- referenced TCEQ rules that I reviewed in the performance of my review, yes.
Q So the application form directed you to a particular TCEQ rule. Am I correct?
A Several rules but -- not just one rule, but, yes.
Q Can you tell me what rules the application form directed you to?
A Mostly 305.45 and I think Subparagraph (a) or Paragraph (8) -- or 8, not A -- 8.
Q "A," like, in "apple"?

A No, (8), I believe. It may be (a)(8). I don't know right off the top of my head.
Q Is there something you have before that would help you refresh your recollection as to what rule you reviewed?
A I think it's in my prefiled testimony, yes.
Q Would you take a moment and review your prefiled testimony and tell me what you recall reviewing as an applicable requirement?
A Yes, it was 305.45 Paragraph (a), Subparagraph (8).
Q Any other rules that you found applicable to the TexCom application for the surface facility?
A Yes.
Q Could you tell me what it is?
A Well, I believe that all of Section 305.45, since it relates to the preparation of applications, relates to the TexCom facility, and the underground injection well rules, Chapter 331 obviously relate to that.
Q Is that a full and complete list of the rules that you have, in your opinion, determined to be applicable to the surface facility?
A I'll add in that the Texas Engineering Practices Act. I also reviewed that.

Q That's a good one. Let's talk about that one. As part of your work for landfills, do you -- have you affixed your professional engineer seal to documents as required by the TCEQ?
A Yes, I have.
Q Have you ever had any discussion or deliberation with the agency as to a document the agency asked you to seal and you felt that the Engineering Practices Act would not authorize you to seal?
A I've had discussions with the TCEQ where I didn't think it was appropriate to seal a drawing.
Q And could you explain those experiences?
A One I recall is they were typically drawings that I didn't believe were engineering drawings. They were contained within an application for a permit for a facility, and TCEQ had requested that we affix our seal to those drawings, and we either thought, well, it might be enough of a gray area that we went ahead and sealed, but since it was prepared under my jurisdiction -- or my supervision or another engineer's supervision, or we would discuss it with the TCEQ and resolve it in some fashion.
Q Okay. But is it true, Mr. Shull, in your experience that generally in those discussions that

the TCEQ controls as to what needs to be sealed in an application and what doesn't need to be sealed in an application?
A No, I don't think they control. I think the Texas Engineering Practices Act does.
Q You said there's some gray areas. Let's say the table of contents to a landfill permit application. Have you been required, in the course of your dealing with TCEQ, to affix your professional engineer seal to the table of contents?
A I have been requested to do that, yes.
Q Have you done it?
A Yes, I have.
Q Is it consistent with your understanding of the Engineering Practices Act to affix your seal to a table of contents?
A I think that's a gray area that I don't disagree with that.
Q That didn't give you pause when you've been requested to do that by the TCEQ as to whether that constituted an engineering document?
A No, it didn't.
Q So you're comfortable sealing table of contents, say, in Volume I of a Part A of a TCEQ permit application?

A Table of contents of engineering reports are, I think, appropriate.
Q What about a table of contents as it pertains to land use?
A I don't normally seal land use reports.
Q What about the table of contents that would include a reference to the land use part of the application?
A If the table of contents was a line item -- I'm sorry. If the land use report was in the table of contents as the line item of the larger application, I would seal that.
Q The reason for my question is because a large part of your testimony is devoted to whether the proper documents in the TexCom application had the seal of a professional engineer.
Do you understand why I'm asking these questions?
A Yes, I do.
Q You said that there are some gray areas in your experiences -- your personal experiences in dealing with what needs to be sealed in an application and what doesn't need to be sealed in an application. Am I correct?
A Yes, that's correct.

Q And as between your interpretation of what should be sealed or should not be sealed, is it the TCEQ at least that directs whether a document needs to be sealed?
A They generally issue an opinion on that in the form of an NOD.
Q And have you reviewed the notices of deficiency in this case?
A To a limited extent, yes.
Q Did you find anywhere where the TCEQ requested that an engineering document, or any other document for that matter, in the TexCom application be affixed with the seal of a professional engineer and TexCom did not comply?
A I don't recall that.
Q Is it fair then to conclude, Mr. Shull, that TexCom complied with the TCEQ requirements of what documents in the TexCom application needed to be sealed by a professional engineer?
A Mr. Riley, I don't remember seeing where the TCEQ issued an opinion one way or the other on that.
Q Well, I guess my question was different. My question is, did you find anywhere where TCEQ said, "This document or this diagram or this figure is not properly sealed," and TexCom said, "Well, I'm not

going to seal it"?
A No, I didn't find that.
Q As far as you know, at least as it pertains to TCEQ's requirements, TexCom sealed the documents TCEQ considered required to be sealed?
A As far as I know.
Q Were you here when Mr. Brassow testified earlier?
A For part of his testimony, yes.
Q Did you hear the portion of the testimony where he talked about the design of the process area? He had a term, M something. I can't recall it off the top of my head, but the area where the activity, meaning the unloading -- unloading of trucks into storage tanks would occur?
A I heard him refer to an MCA area, but the unloading area, to my understanding, is outside but adjacent to the MCA area. It's defined as the unloading area.
Q I don't mean to confuse the terms. I'm trying to orient you to ask you questions about the stormwater capabilities as you understand them in the TexCom application.
A Okay.
Q Specifically, you heard Mr. Brassow testify

that his design was capable of accommodating a hundred-year, 24-hour storm event.
A Yes, I heard that.
Q Did you disagree with Mr. Brassow's testimony?
A No, the volume within the containment area is sufficient for the hundred-year, 24-hour storm event.
Q Is that a typical design parameter in your experience of dealing with the TCEQ?
A Yes, it is.
Q Would you say that, in fact, Mr. Brassow's design would exceed the requirements to contain a hundred-year, 24-hour storm event?
A It has a volume that is larger than the rainfall from that area from the hundred-year, 24-hour storm. Is that what you asked? That's what I understand.
Q Well, it's close enough to what I asked to be an answer to it, but is the short answer, yes, that you understood his design to accommodate a greater than 100-year, 24-hour storm event?
A Yes, I heard that answer.
Q Did you have any reason or do you have any reason to disagree with Mr. Brassow's answer?
A For the containment area, no.

Q So your issues then are outside the containment area regarding the management of stormwater. Is that correct?
JUDGE EGAN: Management of what?
MR. RILEY: Stormwater.
A Yes.
Q (By Mr. Riley) By "outside the containment area," I'm talking about the area where activity would not occur. Is that also correct?
A The unloading area is outside the containment area.
Q Is the unloading area contained?
A It is directed to, I believe, a sump within the unloading area, and then the stormwater from that area is proposed to be pumped to three tanks.
Q Okay. So it's a contained area. It may not be within the containment area that we're discussing for the hundred-year, 24-hour storm event, but it still is in an area that has containment. Is that correct?
A Well, I think it is, in the application, sized for the hundred-year, 24-hour storm event, but it's not -- if you want to define one as the MCA area and the other as the unloading area, this would be the unloading area.

Q So the unloading area, using that designation which is correct -- I'm not disputing that -- the unloading area is also designed to accommodate the hundred-year, 24-hour storm event?
A In the manner that I just described, yes.
Q Do you have any disagreement with the accommodation of a hundred-year, 24-hour storm event in Mr. Brassow's design?
A You mean the hundred-year, 24-hour storm as the design event?
Q Yes.
A No.
Q What is the nature of your disagreement then in whether the unloading area can accommodate a hundred-year, 24-hour storm?
A The application indicates that of the three tanks that are required to be available to hold the stormwater capacity from that event, two of the tanks are used for other purposes, and they must be emptied completely prior to the storm event or there's not sufficient capacity.
Q And while we are on this topic, since you and I have been having a conversation, what is a hundred-year, 24-hour storm event?
A That is a storm event that has a 1 percent

chance of occurring in any one year.
Q If the storage tanks were full, as you fear, during one of these events and the MCA containment area has capacity beyond the hundred-year, 24-hour storm event, could it be used for additional containment if, as you said, the storage tanks were full?
A I don't know. I didn't see anything in the application that indicated that the pumping for stormwater removal could pump the stormwater to the MCA containment area.
Q The fact that you didn't see it doesn't mean that it didn't exist. Is that correct?
A I suppose that's possible.
Q So if it did exist, that the pumping system was intact and could pump into the MCA and it is designed to accommodate larger than a hundred-year, 24-hour storm event, that is an alternative. Would you agree?
A Under those assumptions. I didn't see that laid out in the application anywhere.
Q Would that simply be a matter of pumping into the MCA from the unloading area?
A If that could be configured, that's correct.
Q Is that a difficult thing to configure in

your engineering experience?
A I don't know. I couldn't see enough detail about the system to know if that could be done or not.
Q Would it involve more than a pump and some piping into the MCA?
A Electrical and controls and valving. That's about it, yes.
Q I may have included that in the piping, at least in my way of thinking of things, but one could put a pipe into the -- or pump in the sump and a pipe to the MCA, and that would address your concern regarding whether the storage tanks were full when this 1 percent event occurred?
A That could address that.
Q Do you have other concerns regarding the storm event that you believe do not meet TCEQ requirements?
A The application form indicates that a required document is a surface water protection plan and outlines the components that are to be addressed in that plan, and there's a one-page drawing, I believe, submitted as response to the first NOD that, from all I could find out, is the surface water protection plan, and I don't think that that one drawing meets the requirements outlined in the

application form.
Q In the form. Correct?
A That's correct.
Q And you mentioned that the TCEQ at least asked for additional information in the form of a notice of deficiency, and received a response from the applicant, TexCom. And at least the TCEQ seems to disagree with your assessment of whether it meets the requirements in the application form. Is that correct?
A I don't know. I can't answer for the TCEQ.
Q Well, let's talk about your experiences in dealing with notices of deficiency in applications you've submitted. I don't mean to make an assumption.
Have you only submitted perfect applications for permits to the TCEQ?
A I would like to think so, but they have resulted in NODs.
Q So you've gone through the notice of deficiency process?
A Yes, I have.
Q Even with your good conscientious engineering on the front end of the project, the TCEQ has still found things that it believes you should have submitted as part of your original application.

Correct?
A Or additional information, that's correct.
Q And that seems to have occurred on the topic that we're discussing where the TCEQ asked for additional information, and the applicant responded?
A Yes, that is correct.
Q So it's not as though TCEQ overlooked a requirement in the application form. They actually indicated to the applicant that that information needed to be supplemented in the application. Correct?
A Yeah. I believe that they -- there was not a surface water protection plan in the original application. They asked for that one.
Q And something was submitted. Whether you personally think it's sufficient or not, something was submitted to the TCEQ in response to that notice of deficiency?
A That is correct.
Q And that purported to be a surface water protection plan. Correct?
A It is labeled as such.
Q And, again, back to my question, it's not an oversight then, on the TCEQ's part, based on the interaction we just discussed that a surface water

protection plan needed to be submitted as part of the application?
A That's correct.
Q You just disagree with the TCEQ's determination as to whether it's sufficient or not?
A I guess that's correct.
Q And, again, you've never designed a -- surface facility for a UIC well previously. Correct?
A That's correct.
Q The application form we've been referring to, is that unique to a Class I non-hazardous liquid waste surface facility?
A I'm not sure if that's unique in that it's the only place that it's used for.
Q You didn't look at -- did you look at the instructions for that form?
A Yes. Well, the form -- the instructions are contained within the form, and I seem to believe it is for storage facilities associated with underground injection wells.
Q Non-hazardous -- Class I non-hazardous?
A I think that's correct.
Q Would it also be inclusive of Class I hazardous wells?
A I don't have the form in front of me.

Q The answer is you don't know. Is that correct?
A Not off the top of my head, no.
Q Do you have the form somewhere in the exhibits before you?
A I don't see it here.
JUDGE EGAN: Are you referring to District No. 7?
MR. RILEY: I think so. I need to check with the person who really knows things.
JUDGE EGAN: I think it's behind your prefiled testimony.
JUDGE WALSTON: I was going to say, is Tab 7 the form?
A Tab 7 is the completed application form. I thought you were talking about the blank form, but I can refer to my Exhibit 7.
Q (By Mr. Riley) Your Exhibit 7, though, is that the application form that you understand is applicable in this case?
A Yes, it is.
Q What's the date of your form?
A April 3, '06.
Q When was this application submitted?
A I believe in '05.

Q Do you know if the form changed from the time of submittal by the applicant to the form that you referred to in your prefiled testimony?
A I believe in Mr. Brassow's prefiled testimony that I reviewed he stated that there were insignificant changes.
Q That's not my question, though that's helpful, but maybe I would have asked that later. Are there changes?
A I haven't seen the previous form, so I don't know.
Q So you haven't looked at the TexCom application form, which I believe is the revision from September 27, '04 -- 2004?
A Their form, yes, I've looked at that.
Q You've looked at it?
A Yes.
Q What, if anything, are the changes between the one that you've attached as an exhibit to your prefiled testimony and the form that was actually in place when TexCom applied?
A Looked to me like it was very similar.
Q How detailed is your review, Mr. Shull?
A Relatively detailed.
Q So is it the same, is it different? And if

it's different, how so?
A I don't recall any differences that I noticed.
Q Regardless of whether there are differences or not, is there a part of the form that you can find that says it relates only to UIC surface facilities?
A Well, the title of the form is Permit Application to Store, Process Industrial Non-hazardous Waste.
Q And you said that you have experience with municipal solid waste landfills that handle this type of waste, industrial non-hazardous waste. Correct?
A That is correct.
Q And have you ever filled out this application form as part of your permitting of a non-hazardous waste handling facility at a landfill?
A No, I have not.
Q How have you done that, if you've done it at all?
A They have been permitting as part of a landfill facility, as a component of that facility.
Q Do you know that this form does not apply or is it your testimony that this form would not apply to a surface facility or a storage facility at a municipal solid waste landfill?

A I've testified I've never had to complete this form.
MR. RILEY: Thank you, everyone. Mr. Shull, I have no further questions.
JUDGE EGAN: Ms. Goss?
CROSS-EXAMINATION
BY MS. GOSS:
Q Mr. Shull?
A Yes.
Q My name is Diane Goss. I represent the Executive Director. I have a few questions for you.
A All right.
Q Can you tell me if leachate from a Class I waste cell in a municipal solid waste landfill can be recirculated?
A That can be recirculated within the Class I cell but not within the municipal waste.
Q Thank you. Do you have any knowledge about the fate of the liner system -- the plastic liner system in response to industrial non-hazardous Class I constituents?
A Could you define what you mean by "fate"?
Q What might -- if it degrades or erodes in any way the landfill.
A I know there have been a number of studies of

the long-term effects of these lining systems, but without some -- no, I haven't done any of those studies.
Q Thank you. Do you know if the city of Conroe -- I believe this is what was testified to, but I'm going to have to clarify. Does the city of Conroe have a publicly owned treatment works?
A Yes, they do.
Q Do you know if they accept Class I non-hazardous industrial waste?
A I don't know.
Q Do you know how the TCEQ handles its applications in terms of the date of submission and what rules are applicable or what application forms are applicable?
A My understanding is that you're reviewed under the rules in effect upon the date of submission, and in some cases, when it's declared administratively complete.
Q Thank you. I wanted to ask you a question about your testimony on Page 11, Lines 3 and 4.
I'm sorry. Withdraw the question.
MS. GOSS: I have no further questions. Thank you, Mr. Shull.
A Thank you.

JUDGE EGAN: Mr. Gershon, do you have any redirect?
MR. GERSHON: Just a moment, Your Honor.
(Brief pause)
MR. GERSHON: I do have some.
JUDGE EGAN: Okay. Proceed.
REDIRECT EXAMINATION
BY MR. GERSHON:
Q Mr. Shull, Mr. Riley had asked you whether certain documents presented in the application -- talking about the industrial solid waste permit application -- may have required an engineering seal, documents that were part of the application, whether they required a seal.
He did not walk you through each of the engineering drawings and the list of documents you provide in your testimony, and I just want to clarify for the record what you intended by your answer to Mr. Riley.
I think it was at least unclear to me whether your answer was, no, there were no documents whatsoever that required a seal, or whether there might be.
Could you clarify your answer to the question, are there any documents contained within the

applicant's application that may require a seal but that were not sealed?
A Yes.
Q Let me ask you, would it help to refresh your recollection? I mean, the list is in your prefiled testimony, if that's helpful. I mean, you have an opportunity to look at that. Would that be helpful?
A Certainly.
Q Okay. I have it at Page 24 of your prefiled testimony, beginning --
A Yes, Line 10 on Page 24 outlines that I was referring to TexCom Exhibit 39, and on Page 33, it starts the -- I guess Section IV, titled Engineering Report. That's obviously an engineering document. It's titled Engineering Report.
Then on TexCom Exhibit 41, on Page 3, entitled Waste Management Unit, it has 26 management units and design capacity shown. That's obviously an engineering document in my opinion.
And Page 4 of Exhibit 41 is surface equipment. It has 30 management units described in the description, the minimum number required for the facility. To me, that's an engineering document prepared by an engineer.
And Page 5 of 6 of Exhibit 41, the waste

management unit information, it has 26 permitted unit descriptions, waste numbers and types to be made to each unit. To me, that's an engineering seal.
And it's not in this section, but the surface water protection plan, to me, is obviously an engineering document that should have been sealed.
Q Were you in any way amending this testimony by the way you answered Mr. Riley's questions?
A No, I was not.
Q So let me make sure I understand. I think Mr. Riley was trying to get you to make clear in the record whether TCEQ had any requirements for engineering seals.
Do you know whether TCEQ has specific requirements for -- that the seals be provided for each of these items as you've just listed? And does -- well, once you answer, I've got a follow-up question to that.
A I think in the TCEQ rules, they require that all engineering documents be sealed by a professional engineer registered in the state of Texas, and they're basically quoting the Texas Engineering Practices Act for that requirement.
Q And just to make sure that I understood your testimony, are you saying that each of the items on

this list are engineering drawings or documents that would require a seal?
A In my opinion, they are.
MR. GERSHON: I have no other questions.
JUDGE EGAN: That was all?
MR. GERSHON: That was my only question.
JUDGE EGAN: Any recross?
MR. FORSBERG: No questions.
MS. COLLINS: No questions.
JUDGE EGAN: Mr. Riley?
MR. RILEY: Just briefly on the last topic.

RECROSS-EXAMINATION

BY MR. RILEY:
Q You mentioned that there were gray areas as to what needs a seal and what doesn't need a seal, and you've experienced some of those interactions with the TCEQ. Is that correct?
A That is correct.
Q So you're saying that this is black and white?
A A document titled Engineering Report is black and white.
Q I understand it's colored black and white, Mr. Shull, and I'm not trying to be cute. Are you

saying that it is black and white under the Texas Engineering Practices Act that that document must be sealed?
A In my opinion, it is.
Q That's not my question. Is it black and white; not in your opinion, not in your interpretation. It's black and white, or could it be in a gray area?
A No, I don't believe so.
JUDGE EGAN: You don't believe that it's in a gray area?
A That is -- yes. I don't believe it's in a gray area.
Q (By Mr. Riley) Are you an expert in legal requirements under the Texas Engineering Practices Act?
MR. GERSHON: I'm going to object. That calls for a legal conclusion. I think that what Mr. Riley is asking for is a legal interpretation of those requirements that this expert is not qualified to provide. I think he's qualified to provide what his experience is and his understanding is, and I'm fine with him answering the question, but I would make an objection that if you're asking for a legal opinion, this expert is not an attorney.

JUDGE EGAN: I understand he's not an attorney. Objection overruled, but you might want to rephrase the question because I'm not sure what you meant.

MR. RILEY: Fair enough.

Q (By Mr. Riley) You're not offered as a legal expert. Is that correct?

A That is correct.

Q And is it also correct that your expertise in this matter is limited to the requirements for meeting TCEQ regulations as it pertains to the TexCom application?

A My expertise in this is as 26 years as a registered professional engineer in Texas.

Q How are you qualified in this matter, if you know?

A In what specific manner, of whether a document should be sealed or not?

Q No, no, no. I'm asking you, were you designated as an expert under the -- to make a -- or to offer an opinion on the requirements of the Texas Engineering Practices Act?

A I think I'm offered to offer an opinion on whether documents that are submitted to the TCEQ should be sealed or not.

Q That's the extent of your expertise?

A No.

Q Let's go around again. Are you qualified, through training or experience, to offer a legal opinion?

A No.

Q Is the Texas Engineering Practices Act a legal statute?

A I believe it is. It's a legally authorized and developed statute.

Q Then are you an expert -- a legal expert in interpreting the requirements of the Texas Engineering Practices Act?

A I am not a legal expert in that, no.

Q So that is simply your personal opinion, not based on training or expertise to give a legal interpretation. Correct?

A That is correct.

Q And the best you could offer us is that in your experience that you have had to affix your seal to certain documents that you would consider in a gray area under the Texas Engineering Practices Act when you've performed or submitted permit applications to the TCEQ?

A Not just in gray areas. I feel some

documents are clearly engineering documents requiring seals. Some are clearly not engineering documents not requiring seals. There are some that are in gray areas, yes.

Q All right. Based on your personal experience, you've dealt with engineering documents in that gray area --

A Yes, I have.

Q -- where the TCEQ thought it was an engineering document and you didn't think it was an engineering document?

A That has occurred.

MR. RILEY: Thank you. I have no further questions.

JUDGE EGAN: Anything further from the ED?

MS. GOSS: No further questions. Thank you.

JUDGE EGAN: Anything further, Mr. Gershon?

MR. GERSHON: I have none.

JUDGE EGAN: Okay. Did you have any questions?

JUDGE WALSTON: No.

JUDGE EGAN: You may be excused. Thank

you.

A Thank you.

JUDGE EGAN: Okay.

MR. HILL: Your Honors, I know we're approaching the six o'clock hour. We're happy to call our next witness. We're happy to take that up first thing tomorrow, whatever you --

JUDGE EGAN: Why don't we go ahead and call your next witness and get the direct in, and then we'll start tomorrow with cross.

MR. HILL: In that case, the Lone Star Groundwater Conservation District calls Philip Grant.

(LS/District Exhibit Nos. 8 through 15 marked)

(Witness sworn)

JUDGE EGAN: Would you state your full name for the record?

A Philip Robert Grant.

JUDGE EGAN: Mr. Hill, you may proceed.

MR. HILL: Thank you, Your Honors.

PHILIP ROBERT GRANT,

having been first duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. HILL:

Q Good evening, Mr. Grant.

A Good evening.
Q Would you mind explaining how you have been called to testify in this case?
A I have been called to testify as to the injection well permit application filed by TexCom for the area -- the Conroe area on this specific issue, and I have been -- I'm an employee of Terra Dynamics, and Terra Dynamics was retained by Lloyd, Gosselink and associates to review this application document.
Q In the course of that review, was that done ultimately on behalf of Lone Star Groundwater Conservation District to your understanding?
A Ultimately on behalf of Lone Star, yes, Groundwater Conservation District.
Q In the course of that review, have you prepared prefiled testimony?
A Yes, I have.
Q Is that prefiled testimony before you as exhibit -- District Exhibit 8?
A Yes, it is.
Q Are there any corrections to that testimony you would care make?
A Yes. There are several minor -- just corrections to that, errors in the information.
On Page 60, Line 20, it should have

read, "issue that the 18 wells," not "issue that the SW wells." So "18" replaces "SW."
Q Okay.
A On Page 61, Line 1, it should read "depth of 18 of these wells," not "depth of any of these wells," and that is the total of my corrections.
Q Okay. With those corrections then, Mr. Grant, do you offer up this prefiled testimony as though you were giving it under oath on the stand this evening?
A Yes, I do.
JUDGE EGAN: All right. There was an objection sustained as to Mr. Grant's testimony on Page 41. Has that been redacted from --
MR. HILL: It has not, Your Honors, but it will be redacted by the end of the hearing, and subject to Your Honors' ruling on that motion with respect to his testimony, the district would offer up District Exhibit Nos. 8, 9, 10, 11, 12, 13, 14 and 15.
JUDGE EGAN: Subject to our ruling on the objections, Exhibits 8, 9, 10, 11, 12, 13, 14 and 15 offered by the district are admitted.
(LS/District Exhibit Nos. 8 through 15 admitted)
JUDGE EGAN: Is this a good place to

stop? Are you finished with your --
MR. HILL: I'm prepared to pass the witness.
JUDGE EGAN: All right. We'll reconvene tomorrow morning at nine o'clock. And for scheduling purposes, I believe that on Friday we're going to adjourn at 5 so everyone can get home before midnight. I know there are a number of people who are from out of town. Does anybody have any problem with leaving at 5 instead of 6?
JUDGE WALSTON: I want to stay till 6.
(Laughter)
MR. FORSBERG: Your Honor, are we off the record?
JUDGE WALSTON: Yeah. We can go off the record, yes.
MR. FORSBERG: I want to discuss a scheduling issue off the record.
JUDGE EGAN: We're off the record then.
(Proceedings adjourned at 5:44 p.m.)

H

J